

FINANCIAL AND LIQUIDITY MANAGEMENT  
STRATEGIES FOR A NORTH CENTRAL  
OKLAHOMA WHEAT AND  
LIVESTOCK FARM

By

TIMOTHY LEE CROSS

Bachelor of Science in Agriculture

Oklahoma State University

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Thesis Approved:

*Odele L. Walker*

Thesis Adviser

*Harry P. Mapp*

*Ralph C. Jones*

*Norman N. Buchanan*

Dean of Graduate College

## PREFACE

This study is concerned with incorporating liquidity management strategies into a linear programming model of a benchmark North Central Oklahoma wheat and livestock farm. The study focuses attention on the lending practices of Oklahoma agricultural lenders, and the impact these practices have on farm management. Several management applications are examined using the linear programming model constructed and modified according to the results of the lender survey conducted in the study.

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## CHAPTER I

### INTRODUCTION AND LITERATURE REVIEW

Farmers are becoming increasingly dependent upon credit. However, increased use of credit can lead to small credit reserves which farmers use to cope with variations in cash flows. Because of this potential conflict between farm production decisions and risk management decisions, the whole farm's production, marketing, and financial activities require coordination. This study will evaluate risk management within a North Central Oklahoma wheat and livestock farm by examining the use of a credit reserve as a liquidity management tool.

Liquidity management does not attempt to prevent uncertainty. Instead, liquidity management provides resources to meet adverse economic situations which may occur due to uncertainty. Cash flows may be affected by uncertain commodity prices, marketing strategies and storage plans. The farmer must consider his attitudes toward risk, his risk bearing ability, and the distribution of possible outcomes from alternative plans and develop strategies to shift, reduce or improve his ability to bear risk.

The farmer's alternatives may be affected by his lender, who will be attempting to manage his own financial risks. The lender's risks are associated with additional loan servicing, loan extension and default by the borrower. Risk management responses by lenders may take

the form of restricted loan amounts and conditions, risk premiums added to the effective interest rate, collateral requirements and earlier loan maturities. The final effect of these lender strategies on the farm and the lender is of interest to both.

Considerable research has been conducted on liquidity management for cash grain farms in Illinois (7, 9, 11, 41, 42). For Oklahoma farmers, financing of stocker cattle to go on wheat pasture represents sizable short term investments, requiring careful management of both the enterprises and their financing. The North Central Area of Oklahoma in particular is known for large stocker operations. Farmers in the area have depended on stockers grazed on wheat pasture for an important portion of their income. A farm running 400 stockers costing \$400 per head requires an investment of \$160,000 in cattle alone.

Large purchases of stocker cattle have typically been financed with short term commercial loans. However, the survey conducted in this study revealed that demand for stocker loans dropped sharply in 1980, followed by a greater decrease in 1981. Many lenders expect additional decreases in stocker loan demand in the future. The declining loan demand may be caused by two factors. First, expected cattle prices may be low, causing stockers to appear unprofitable. Analysis of the case farm used later in this study showed that even at low stocker prices a profit could be made in stocker cattle. Thus, expected low returns are not the sole cause of the decreased loan demand.

A second factor which may explain the declining loan demand is that farmers place high liquidity values on credit in reserve, causing credit in use to decline. Lenders surveyed expressed a strong desire to supply financing to farmers. This supports the liquidity value argument, since

credit constraints appear to be imposed internally rather than externally. A need exists for investigation of the liquidity management strategies and credit constraints imposed in stocker cattle operations.

### Objectives of Study

The objectives of this study are:

1. To identify alternative farmer and lender strategies for the North Central Oklahoma wheat and livestock farming area.
2. To derive a liquidity cost curve for a benchmark North Central Oklahoma wheat and livestock farm.
3. To estimate and evaluate the impacts of alternative organizational and price situations on the returns and liquidity position of the benchmark farm.

A linear programming model of a benchmark 1,280 acre farm in North Central Oklahoma was constructed to identify farmer strategies in the area. Lender behavior was determined by surveying 33 agricultural lenders.

The remainder of this chapter is devoted to liquidity management concepts and a review of literature pertinent to this study. Chapter II reviews the theory of the production organization of the farm, and extends these results to include liquidity costs. An equilibrium in credit use will be derived which will lay the foundation for the derivation of the liquidity cost curve for the case farm. The third chapter explains the methods and assumptions used in building the linear programming model of the benchmark farm. The methods used to incorporate the liquidity management strategies into the model are also discussed in Chapter III. The fourth chapter reports results of the survey of agricultural lenders used in this study to determine lending rules

faced by farmers. Results of survey are summarized, analyzed and used to modify the case farm in Chapter V. The liquidity cost curve is then traced out. Chapter V also presents the solutions obtained by varying the farm organization, the activities considered, and prices used. A parametric price routine is used in Chapter V to trace out the liquidity value curve for the farm. The final chapter, Chapter VI, presents a summary of the various lending rules and linear programming solutions arrived at in the study. In addition, conclusions reached in the study are discussed.

### Definitions and Terms

To evaluate liquidity management strategies, the concepts underlying liquidity must be identified. The sources and costs of liquidity should be recognized by the farm manager. The manager should also examine the alternatives to liquidity management and their costs.

#### Liquidity Management

Liquidity may be defined as the ability of the firm to acquire cash to meet cash demands as they occur and provide cash for unexpected events. Liquidity needs relate to the stage of the farm growth cycle. A farm experiencing rapid growth through increased financial leverage will probably have a low degree of liquidity. Conversely, a farm experiencing little or no growth may have a very high degree of liquidity. The growing farm will be relying heavily on borrowed funds. This borrowing tends to reduce a farm's liquidity through depletion of credit reserves, additional cash flow obligations and increased fixed assets. The stable farm will be reducing its' dependence on borrowed funds. The decreased

dependence on borrowed funds will lead to an increase in a farm's liquidity because of an increase in credit reserves, fewer cash flow obligations and increased liquid assets. The farm manager is forced to make a choice between high growth and high liquidity.

The two main sources of liquidity available to a farm manager are provided through the liquidation of assets or the use of a credit reserve. Various costs are associated with each of these sources of liquidity. The farm manager must recognize these costs and consider them in determining the amount of liquidity he desires.

The liquidation of an asset may have a severe impact on the farm, depending on the nature of the asset. Current assets sold as part of the farm's usual operations have little impact on the farm. Current assets which must be sold before the planned sale date because of cash needs may result in reduced income to the farm. The forced date of sale may cause the farm manager to receive seasonally low prices leading to decreased income for the farm.

Transaction costs may be incurred with the liquidation of both fixed and current assets. Transaction costs include transportation charges, commissions, storage charges, installation and assembly charges and losses in transit. These transaction costs may be very small for financial assets, but they can become quite important for fixed assets and livestock and grain inventories.

The liquidation of fixed assets such as machinery, equipment or land usually has a severe impact on the farm. The owner's equity in the farm will be reduced, as well as the income-generating capacity of the farm. Fixed assets may be sold at much less than the value of the asset to the farm, due to the limited alternative uses. Also the sale of

fixed assets is looked upon by many to be indicative of future liquidation of the whole farm.

The use of credit and a credit reserve provides an alternative source of liquidity. A credit reserve is the difference between the maximum amount of credit available to a farm and the credit actually utilized by a farm at a point in time. Lenders determine the credit capacity of a farm (external credit capacity), while the farmer must make a decision as to how much to use (internal credit capacity). In evaluating a farm's credit capacity, lenders examine many factors, including the personal characteristics of the farm manager. The credit capacity of the farm can be considered an asset which must be managed, and can be caused to increase, decrease or change in structure.

Credit and the credit reserve used as a source of liquidity also have costs associated with them. The most obvious cost of credit is the interest rate which must be paid on outstanding debt. A less obvious cost is the liquidity premium (value) which the farm manager places on maintaining credit in reserve. As increasing amounts of credit are used, credit in reserve will be valued more highly.

To summarize, maintaining a farm in a liquid position entails costs through both the liquidation of assets and the use of a credit reserve. The liquidation of assets may have an adverse effect on the operation of the farm, reducing its' income-generating capacity and entailing transaction costs. Credit and cash reserves are costly to maintain because of the forfeiture of profitable investment opportunities and reduced income through restricted growth. The primary task of liquidity management is to minimize the costs of holding liquid reserves. Liquidity management is a type of risk management, providing cash for unexpected events.



### Risk Management Alternatives

The farm manager should compare the costs and returns of financial alternatives of risk management with production and marketing risk management alternatives. Risk management alternatives in production include diversification and flexibility. Marketing risk management choices encompass forward contracting, storage of commodities, hedging and government program participation. Financial alternatives include insurance and liquidity sources as discussed previously.

Diversification of a farm may provide more stable cash flows and thus reduce the level of liquidity which must be maintained. However, a specialized, intensive farm organization has the opportunity of becoming more efficient through economies of size and thus achieving a higher income than the diversified organization. This shows a tradeoff between stability and earnings potential as the source of the costs and returns of diversification in production. Likewise, this same tradeoff exists in the use of flexibility in production as a risk management alternative. Production flexibility entails the use of more short term assets relative to fixed assets, multi-purpose machinery and equipment and short term enterprises. Each of these choices generally result in lower income over time but lower risks.

Forward contracting as a marketing alternative in risk management is a common practice for livestock producers. A forward contract is an agreement between a buyer and a seller which specifies the price, date of delivery and quality of a product. The forward contract provides a more certain income for the farm and thus reduces the need for liquid reserves. However, the use of a forward contract may result in an

increased need for liquidity. A farm manager may be forced into the cash market to purchase the product he contracted if poor yields cause him to be short of his contract commitment. In addition, there is a risk that the cash price will rise above the contract price and income will not be increased.

Storage of crops for future sale is widely practiced by grain producers. Storage of grain may reduce the need for other liquidity by providing a source of credit or cash through the sale of the product. Returns from the use of storage as a risk management alternative are found in this reduced need for liquidity. Unfavorable price movements during storage periods may increase the amount of liquid reserves required by extending the storage period and postponing planned sales dates. The costs of storing crops include facility and opportunity costs.

Hedging may be combined with storage in managing risk and liquidity. The use of hedging may reduce the need for a large liquidity reserve which is necessary to offset the effects of unfavorable price movements associated with storage of grain. Hedging of grain, timed consistently with a storage policy, can cancel most of the price risk accompanying storage. The use of hedging may not be warranted if the price of the commodity is expected to rise. In this case, hedging would lock in a low price, require a large amount of liquidity and result in the loss of the expected higher income. The possibility of margin calls may also require liquid reserves.

Producing products whose prices are supported by government programs is also a marketing alternative in managing risk. Production quotas and price specifications can reduce price risks and thus liquidity reserves

required. Government program participation may introduce added uncertainties, including the length of time the program will be continued and changes in the guidelines for compliance.

The financial alternatives used in managing risk consist of liquidity management, which was discussed earlier, and insurance. Insurance is a means by which a farmer may utilize the liquidity reserve of another firm to indemnify the farmer in case the insured event transpires. The costs of insurance are the annual premiums which the farmer must pay the insurance company and the benefits result from the lower liquidity reserve which must be maintained with the insurance in effect.

#### Literature Review

Early research in credit as a liquidity management tool was done by Baker (5). Baker argues that the traditional equilibrium conditions used by economists must be modified to reflect the effects of borrowing on liquidity. He defined credit as the capacity to borrow and identified certain costs associated with using credit. These costs included both an interest rate and a charge for a loss of liquidity.

Baker then incorporated these ideas into a multiperiod linear programming model, with emphasis placed on financial constraints. The problem with this model was that many of the parameters were not known, and needed to be estimated. According to Baker (5)

. . . what is required is an estimate of total credit available from alternate sources, in whatever categories it is relevant to make differentiations, and rates at which such credits are absorbed (or generated) by financial, production, and marketing activities (p. 516).

In a later article, Baker (4) suggests additional modifications required in specifying optimal combinations of resources. Another multiperiod linear programming model was devised, with emphasis on land acquisition, credit and debt. In this model, Baker identified inter-relationships which occur among alternative lending institutions. For instance, an increase in equity will change the credit available from real estate and non-real estate lenders. Hence, credit becomes a resource which must be managed by the firm.

Again, Baker found the empirical requirements to be formidable. These requirements were needed from two sources. First, lenders' behavior must be questioned to determine coefficients associated with generation or absorption of credit. Second, farmers' views on the value of unused credit as a source of liquidity are necessary. Baker's work had concentrated mainly on the first requirement, with almost no results obtained for the second requirement.

In Figure 1, a submodel of the type developed by Baker is presented, illustrating the inter-relationships among credit sources and uses. In this model, credit is available from three sources: a Federal Land Bank (FLB), a commercial bank (Comm.), and a non-real estate lender (NRE). Land is available as quality  $A_1$  or  $A_2$ , or it may be leased,  $A_3$ . Capital ( $K_1$ ) may be purchased, and is allocated among the use activities. A row for cash is included which shows borrowing and production activities to be a source of cash, while the activities which acquire land and repay debt are a use of cash.

The coefficients in the three credit rows show the impacts of acquisition and use activities on the credit of the farm. For instance,  $r_{11}$  shows the acquisition of  $A_1$  to have an affect on the credit available

Row		Acquire			Buy	Borrow For			Use			Con-	Repay Debt			Rela-	RHS
		A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	K <sub>ij</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	sume	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	tion	
Land:	Own A <sub>1</sub>	-1							1							L	b
	Own A <sub>2</sub>		-1							1						L	b
	Lease L <sub>1</sub>			-1												L	b
Capital					-1				ka	kb	1					L	b
Cash		1	1	1	1	-1	-1	-1	-fg	-fg	-fc	1	da	db	dc	L	b
Credit:	FLB	r <sub>11</sub>	r <sub>12</sub>		r <sub>K1</sub>	r <sub>11</sub>	r <sub>21</sub>	r <sub>31</sub>	-s <sub>1</sub>	-s <sub>1</sub>	-s <sub>1</sub>					L	b
	Comm.	r <sub>12</sub>	r <sub>22</sub>		r <sub>K2</sub>	r <sub>12</sub>	r <sub>22</sub>	r <sub>32</sub>	-s <sub>2</sub>	-s <sub>2</sub>	-s <sub>2</sub>					L	b
	NRE	r <sub>13</sub>	r <sub>23</sub>		r <sub>K3</sub>	r <sub>13</sub>	r <sub>23</sub>	r <sub>33</sub>	-s <sub>3</sub>	-s <sub>3</sub>	-s <sub>3</sub>					L	b
Debt:	FLB					-1							1+i			E	0
	Comm.						-1							1+i		E	0
	NRE							-1							1+i	E	0
Consume												1				L	b
OBJ.		g <sub>A</sub>	g <sub>B</sub>		g <sub>ij</sub>											E	Max.

Source: Baker (4, p. 1572).

Figure 1. Submodel of a Multiperiod Linear Programming Model Used by Baker

from lender one (FLB). Similarly,  $R_{21}$  shows the acquisition of  $A_2$  to influence the credit from lender one (FLB). The acquisition of the leased land,  $A_3$ , does not have an impact on credit from any of the three sources in this model.

The borrow activities each contain coefficients in the credit rows to reflect the changes in credit which occur due to borrowing. For instance,  $r_{12}$  shows the affect that borrowing for  $A_1$  has on lender two (Comm.). The leasing activity contains credit coefficients since the action of borrowing for leased land will affect the credit available to the farm. This is in contrast to the acquisition activities, which showed an increase in  $A_3$  to have no impact on credit. The use activities are shown as a source of credit to the farm. This is caused by lenders incorporating income expectations into their lending rules, which generates credit.

The debt repayment activities are shown by Baker as having no affect on credit. Successful repayment of a loan should act to increase credit available. Repayment is a demonstration of the farm's income generating capacity and the ability of the manager to meet commitments as they occur. This view was not held by Baker, however.

This model requires estimation of all the  $r_{nn}$  and  $s_{nn}$  coefficients. Several studies have incorporated some of the features of this model into their work, but none have used all the properties suggested, probably due to the formidable empirical requirements. A discussion of some of these models is found in Baker (4).

The concept of a credit reservation price is examined by Baker and Hopkin (6) in the context of a firm equilibrium in the use of credit. A graphical equilibrium is suggested, equating the marginal value product

curve from resources financed with loans and a curve showing the increments to loan costs from added units of debt. Baker and Hopkin state that the increments to loan costs arise as borrowing occurs. Borrowing reduces the credit remaining available to the firm and causes these remaining units of credit to become more highly valued by the firm.

Barry and Baker (9) examined the credit reservation price further in 1971 and described a method by which the value of unused credit could be estimated. The procedure they used was to compare two actual farms' performances over a 20-year period with a multiperiod linear programming model of the same two farms, covering 21 years. Input data, resource levels, consumption patterns, credit use and production and marketing organization from the case farms was incorporated into the linear programming (L.P.) model.

Credit reservation prices were shown as positive objective function values in slack vectors of the credit constraints in the model, reflecting the value of liquidity to the firm. The L.P. model used was similar to the model described earlier by Baker (4). According to Barry and Baker (9, p. 224) "reservation prices were inferred for decision makers by comparing growth information for real borrowers with growth information generated by the comparable models at alternative reservation prices."

This method succeeded in associating a low reservation price for the farmer described as a "liberal" credit user, and a high reservation price for the "conservative" credit user. In both cases, estimated annual net worth growth per acre was comparable to the actual growth rates of the case farms. Of course, the validity of the reservation prices estimated depends largely upon the parameter values, activities,

constraints, and objectives regarded as given in the model. Nevertheless, this method did illustrate that credit reservation prices included in growth models improve the model's ability to realistically predict firm growth rates.

In a later article Baker and Sonka (7) introduced some refinements of the original point estimate of credit reservation prices. The point-estimate was changed to reflect a functional relationship. The functional relationships included analysis of both cash and credit. Cash could be allocated to either use or reserve, and the reserve cash activities contained positive objective function values. As less cash was allocated to reserve, its value in the objective function increased. Activities producing cash increased the supply of cash to be allocated, while activities using cash utilized cash allocated to use.

The analysis of the credit constraints is analogous to those described above for cash. In addition, a liquidity reserve row was introduced which was affected by the farm's real activities and the amount of cash and credit in reserve, and constrained by the amount of liquidity desired by the farmer. A relatively risky activity using cash or credit contained a large negative coefficient in the liquidity reserve row. A less risky activity had a smaller negative coefficient. Activities producing cash had positive coefficients. According to Baker and Sonka (7, p. 44) "the 'liquidity reserve required' relationship, combined with the liquidity management vectors. . ., constitute a form in which to reflect the farmer's response to risk."

The empirical requirements for Baker and Sonka's model of financial responses included estimates by the farmer of lender behavior and the farmer's valuation of liquidity sources. To determine his



expectations of lender behavior, a farmer must know his credit limits and how they are influenced by his production, marketing and financial organization. To determine this, Baker and Sonka utilized a lender survey including a biography, production and financial data and several loan requests. The lender was instructed to treat the case farm as though it was an actual customer and specify the loan granted, interest rate and any applicable conditions corresponding with each loan request.

The results of this survey showed that the liquidity position of farmers was very important to the agricultural lender. A lender with a farm background was found to have a higher probability of loan acceptance than the lenders with no farm background. The larger lending institutions were positively related to loan acceptance, while a ratio of the loan requested to working capital of the firm was negatively related.

Gabriel (20) examined business risks and how financing decisions affected these business risks. He developed a framework for linking production and investment decisions with financing decisions through a risk constraint. Again, a multiperiod linear programming model was used, utilizing a safety first MOTAD risk model. Gabriel's results showed that a decline in business risk lead to an increased use of debt and thus an increase in financial risk. Farm liquidity also appeared to adjust to changes in business risk.

Barry, Baker and Sanint (11) conducted another lender survey examining the effects of variations in farmer's incomes on loan acceptance for a representative farming situation. The results of their survey showed a positive relationship between farm credit available and the previous year's financial performance of the farm. The survey also

showed that lenders tend to differentiate between operating loans and capital purchase loans in their evaluations. The percentage of loan granted varied much more for capital loans than it did for operating loans. Security and collateral requirements were similar in all cases and the interest rates charged were the same in all cases.

## CHAPTER II

### CONCEPTUAL DEVELOPMENT

Liquidity management is one means of managing risk and a credit reserve is one source of liquidity which may be used to counter adverse economic situations. Unused credit must therefore have value as a source of liquidity and credit capacity may be considered to be an asset which can be managed. This chapter will examine the effects of including credit costs on the production organization of the firm, followed by a determination of credit equilibrium in use and reserve. In addition, the procedures used in applying these credit effects to empirical work will be discussed.

#### Theory of Production Organization

Suppose we have a production function

$$Y = f(X_1, X_2/X_N) \quad (1)$$

where  $Y$  (output) is a function of two variable inputs ( $X_1$  and  $X_2$ ) with all others ( $X_N$ ) constant (5). The ridge lines for this production function are found where

$$\frac{dX_2}{dX_1} = 0 \text{ and } \frac{dX_1}{dX_2} = 0. \quad (2)$$

These ridge lines represent the points of maximum output from  $X_1$  ( $X_2$ ), given a fixed amount of  $X_2$  ( $X_1$ ). They bound the relevant economic region of isoquants mapped on a production surface (17).

Next, the cost function is introduced, represented by

$$C = P_1 X_1 + P_2 X_2 + P_N \quad (3)$$

where  $C$  is the cost of production,  $P_1$  is the price per unit of  $X_1$ ,  $P_2$  is the price per unit of  $X_2$  and  $P_N$  is the cost of  $X_N$ . By setting  $C = c_o$ , the isocost line is given as

$$c_o = P_1 X_1 + P_2 X_2 + P_N. \quad (4)$$

Solving (4) for  $X_1$ , results in

$$X_1 = \frac{c_o - P_N - P_2}{P_1} X_2 \quad (5)$$

Assuming constant input prices, equation (5) represents a straight isocost line with slope  $-P_2/P_1$ .

Output ( $Y$ ) is maximized where

$$\frac{-dX_1}{dX_2} = \frac{P_2}{P_1}, \quad (6)$$

given  $c_o$ .

The locus of points meeting the conditions in (6) is called an expansion path. The expansion path shows the least cost combinations of  $X_1$  and  $X_2$  to be used in production of various levels of  $Y$  (17). The profit maximizing point occurs at the point where the value of marginal product for  $X_1$  ( $VMP_{x_1}$ ) divided by the price of  $X_1$  is equal to the value of marginal product for  $X_2$  ( $VMP_{x_2}$ ) divided by the price of  $X_2$ , which in turn is equal to unity (43). Symbolically

$$\frac{VMP_{x_1}}{P_{x_1}} = \frac{VMP_{x_2}}{P_{x_2}} = 1. \quad (7)$$

The relationships discussed above are shown graphically in Figure 2.

Lines AC and BC in Figure 2 represent the ridge lines for  $X_1$  and  $X_2$ , respectively. The expansion path is shown by line OC and intersects

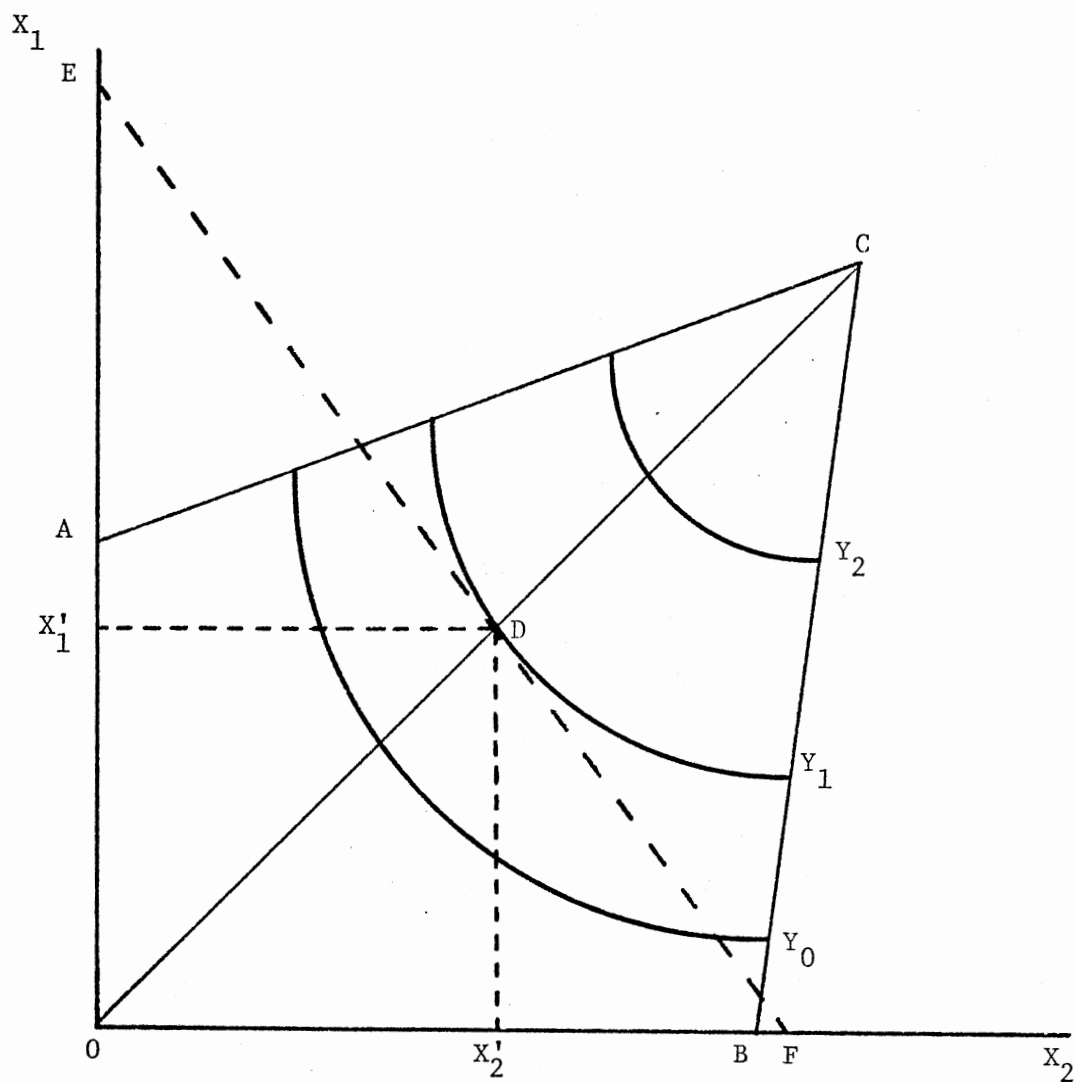


Figure 2. Production Organization of the Firm

the ridge lines where they are equal. Three isoquants for production levels of  $Y_0$ ,  $Y_1$ , and  $Y_2$  are shown bounded by the ridge lines. The iso-cost line EF is tangent to the isoquant yielding  $Y_1$  output of Y at point D, and has a slope of  $-P_2/P_1$ . With the budget constraint included, production would occur at point D, with  $X_1'$  of  $X_1$  and  $X_2'$  of  $X_2$  being used in producing output level  $Y_1$ .

### Credit Costs

The analysis above assumes that the firm has the resources necessary to purchase the required amounts of  $X_1$  and  $X_2$  to be used in production of Y. That assumption may be changed to reflect a firm which must borrow the resources needed to purchase  $X_1$  and  $X_2$ . This will affect the production organization of the firm.

The use of credit in purchasing inputs involves both the tangible cost of the interest on the loan and a non-tangible cost in the loss of liquidity due to decreased credit reserves. The output maximization point specified in (6) must now be redefined as

$$\frac{-dX_1}{dX_2} = \frac{P_2 (1 + F_2)}{P_1 (1 + F_1)} \quad (8)$$

where  $F_2$  and  $F_1$  are the marginal cost per unit of financing  $X_2$  and  $X_1$  (5). If the ratio  $F_2/F_1$  is equal to  $P_2/P_1$ , the expansion path is unchanged. However, if lenders discriminate among uses of credit, this condition may not hold. Lenders may charge higher interest rates for financing some inputs relative to others. An alternative form of discrimination by lenders may be a lower loan limit for financing certain inputs. Thus, the credit reserves of the firm are used up faster when

inputs which have lower loan limits are financed. Either form of discrimination will result in a change in the marginal costs of financing inputs.

Suppose the rate of interest is lower in financing  $X_2$  than it is on a loan for  $X_1$ . This will cause  $F_2$  to be less than  $F_1$ , and decrease the value of the term  $\frac{P_2 (1 + F_2)}{P_1 (1 + F_1)}$  in equation (8). This causes a shift

in the expansion path, shown in Figure 3. The effect of this shift in the expansion path is an increase in costs if production of  $Y$  remains at  $Y_1$ , or a decrease in production at the given cost outlay of  $c_0$  (D). If production remains at  $Y_1$ , the iso-cost line will rotate to HJ. The use of  $X_1$  will decrease from  $X_1'$  to  $X_1''$  and  $X_2$  will increase from  $X_2'$  to  $X_2''$ . The same results hold if lenders hold loan limits for  $X_1$  lower than  $X_2$  and it is assumed credit in reserve has positive value to the firm.

#### Credit Equilibrium

Credit has been shown to be costly to the firm, both in use and in reserve. Total credit ( $C_t$ ) may be allocated within the firm as credit in use ( $C_i$ ) or credit in reserve ( $C_r$ ). This may be written as

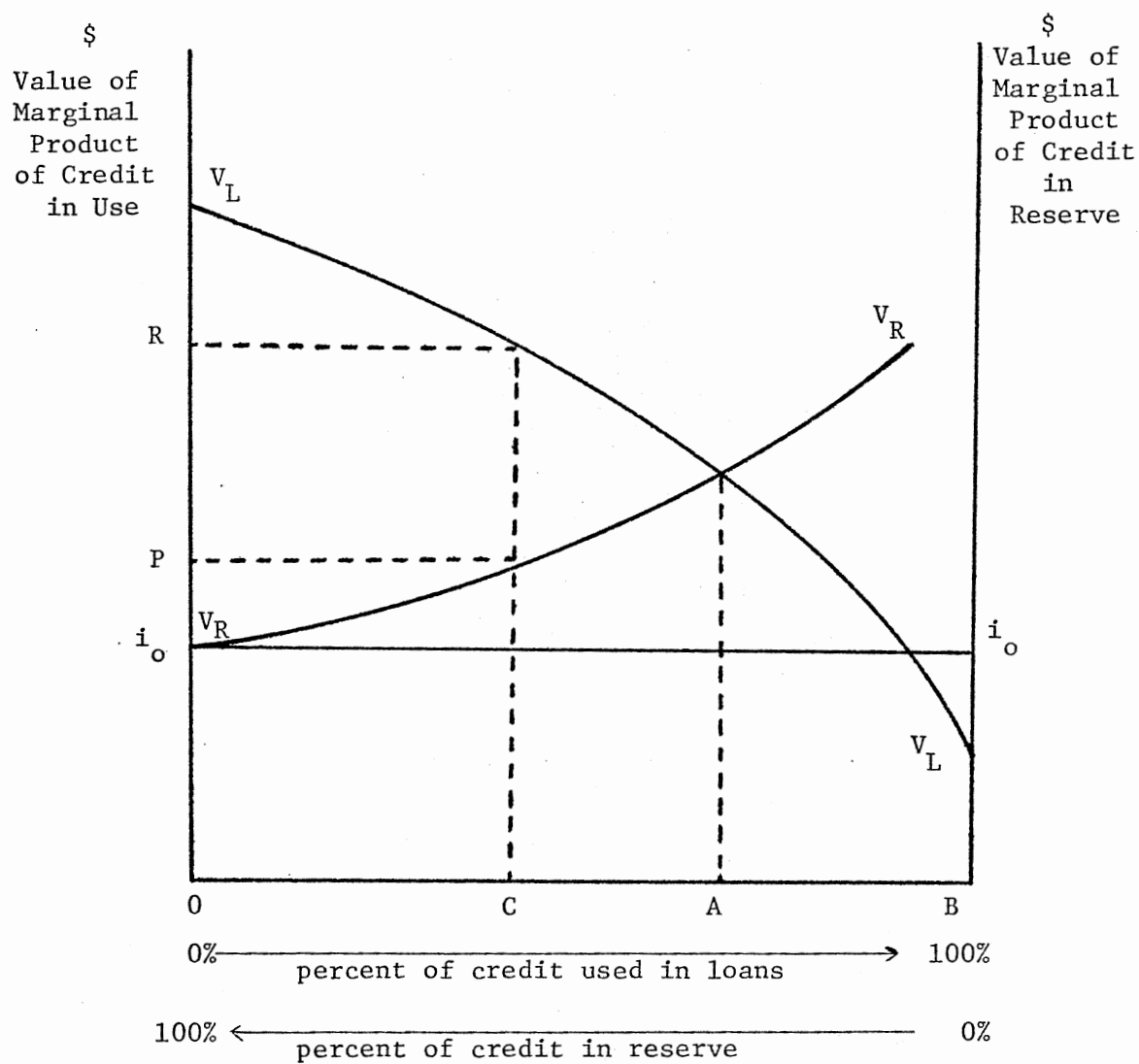
$$C_t = C_i + C_r \quad (9)$$

The farm manager is faced with the task of allocating credit to  $C_i$  and  $C_r$  to maximize profit, subject to his desired level of risk.

Figure 4 is an example of the allocation of one source of credit to the firm (9). The horizontal axis measures, from left to right, the percentage of credit used in loans. The maximum amount available is 100 percent. Movement from right to left along the horizontal axis







Source: Barry and Baker (9, p. 223)

Figure 4. Equilibrium in Credit Use

measures the credit left in reserve. The value of credit in use or reserve is measured along the vertical axis and is measured in dollars.

The curve  $V_L$  shows the value of marginal product of credit in use decreasing at an increasing rate. This is due to the law of diminishing returns. The curve  $V_L$  could represent a measure of the opportunity cost of credit held in reserve. Heady (22) defines this opportunity cost as follows:

The economic cost or sacrifice involved in liquidity is of this nature: the holding of reserves and the maintenance of liquidity implies that if the future could be foreseen more perfectly, the firm could increase its output and profit by reducing the proportion of assets held in the form of money or operator equity. (p. 528).

The value of marginal product of credit in reserve increases as we move from left to right in Figure 4. This is logical, since movement to the right indicates an increase in the amount of credit used and a decrease in the credit held in reserve. The decreasing amounts of credit in reserve would become increasingly valuable to the firm (36). The value of marginal product of credit held in reserve is represented by the curve  $V_R$  (11). This curve is determined by adding together the interest rate ( $i$ ) and the liquidity premium ( $r$ ). It intersects the vertical axis at  $i_0$ . At this point, the amount of credit in use is zero percent and the amount in reserve is 100 percent. If an infinitesimally small unit of credit is now committed to use, the cost of that unit will be  $i_0$ , since  $r=0$  when credit is 100 percent in reserve.

The interest rate is shown as a horizontal line at  $i=i_0$ , which implies that the time period under consideration is the short-run. In the long-run, the interest rate may vary. Agricultural lenders, however, tend to express changes in the cost of loan funds through non-price

practices such as varying loan limits, terms and maturities, according to Baker and Sonka (7). Thus, in the short-run, the interest rate would be expected to remain constant.

Given  $V_L$  and  $V_R$  in Figure 4, the optimal level of borrowing is shown by OA. At point A, the value of marginal product of credit in reserve equals the marginal cost of credit in reserve. The optimal amount of credit in reserve is given by AB.

Consider a firm operating at point C, with the amount of credit in use equal to OC and credit in reserve equal to CB. At C, the value of credit in use (OR) is greater than the value of credit in reserve (OP). The firm needs to allocate more credit to use to attain an equilibrium position. Incentives exist for the firm to use more credit and reserve less.

The more risk averse the firm is, the higher the  $V_R$  curve will lie. This is because a higher risk aversion will result in a larger value of  $r$ . As the  $V_R$  curve shifts upward, the amount of credit in use would decrease, leaving more credit in reserve. This would be typical of a risk-averse manager.

The theory of credit in equilibrium is essentially a modification of the theory of production organization of the firm. Credit in reserve is generally assumed to have positive value to the firm. To obtain an equilibrium, a firm must compare the costs and returns from credit in use and reserve. The liquidity premium is added to the effective interest rate to value credit in reserve.

The empirical measures needed to specify an equilibrium for the firm facing financial, as well as production, alternatives include

(a) farmer's valuations of liquidity sources, and (b) estimates of lender behavior. In this study, the values of liquidity sources for a case farm are obtained using parametric variations of credit reservation prices in a linear programming model. The resulting solutions which are associated with the various credit reservation prices are then examined.

To determine estimates of lender behavior, a lender survey was drawn up using the case farm as a basis. The survey consisted of (1) an interview portion, and (2) a written portion. The interview allowed discussion of topics not specifically covered in the written survey, such as the lender's opinions on agriculture in general. The views held by the various lenders were noted and incorporated into the analysis of the survey results when possible.

The second portion of the survey was written, due to the length and nature of the supporting material accompanying the survey. The respondent was asked during the personal interview to complete the written portion and mail the survey back at his convenience. This allowed the lender ample time in privacy to analyze the cases presented without being pressured by having the interviewer waiting at the institution for a response.

### Linear Programming

A linear programming (L.P.) model was constructed to provide farm financial statements for the lender survey. L.P. was chosen as a model due to its ease of computing solutions given various adjustments in the matrix and restrictions. In addition, detailed information is available

from each solution for price ranges, activity levels, and limiting processes.

The use of L.P. does have limitations, as discussed in Beneke and Winterboer (12), Hillier and Lieberman (23), and Agrawal and Heady (2). These limitations are derived from the following assumptions necessary to construct an L.P. model.

1. Resources and activities are additive, which implies no interaction between enterprises.
2. The objective function is linear.
3. Activities and resources are perfectly divisible.
4. Alternatives in the model are finite in number.
5. Activity levels are proportional to resources. The law of diminishing returns is not taken into account directly.
6. Prices and input-output relationships all have single-valued expectations.

## CHAPTER III

### LINEAR PROGRAMMING MODEL

The case farm used for this study was assumed to be in North Central Oklahoma (Figure 5). The farmers in North Central Oklahoma depend on wheat pasture for a significant portion of their income and stocker cattle are the primary livestock enterprise. This study is concerned with the coordination of whole farm production, marketing and financial plans. The stocker operation involves high seasonal investment decisions. This chapter describes the geographic area and outlines the L.P. model, including production activities, price relationships and credit constraints used in the model.

#### Area of Study

Eighty-nine percent of North Central Oklahoma farms are family operated, 10 percent are partnerships and only one percent are corporate farms (46). Thirty-three percent of the operators are full owners, 48 percent are part owners and 19 percent are tenants. Thus, a considerable portion (66 percent) of the farms in this area rely on rented or mortgaged land. Many farms in the area are large, with 40 percent consisting of 500 acres or more. The upland soil for the farm considered is in the Kirkland-Tabler Association. This is a deep, nearly level to moderately sloping soil that has a clay-type subsoil (48). The



Figure 5. Area of Study

bottomland soil in the area is composed primarily of the Kaw-Brewer Association, which is a deep, loamy to clay-type, highly productive soil.

#### Production Activities

Census data were examined for the 10 counties in Figure 5 to determine the primary agricultural activities (46). The data examined from the census included only farms with sales of \$2,500 or more of agricultural products per year. Wheat is the predominate crop of the area, as shown in Table I. Of the total number of farms in the area, 83 percent reported harvesting wheat in 1978 (46). The average wheat acreage planted per farm for farms which planted wheat was 281 acres. The county averages ranged from a low of 209 acres per farm in Dewey County to a high of 378 acres per farm in Grant County.

Grain sorghum is produced by six percent of the farms. The average acreage of grain sorghum harvested was 62 acres per farm. The range of grain sorghum averages is much smaller than the range of wheat averages. The lowest average was 44 acres per farm in Dewey County and the highest was 85 acres per farm in Kay County.

Approximately five percent of the farms in the area also harvested hay (primarily alfalfa). The average acreage per farm in the area was 48 acres per farm for those harvesting hay. The county averages ranged from a low of 36 acres per farm in Garfield County to a high of 60 acres per farm in Alfalfa County.

The three crops considered in this study will be wheat, grain sorghum and alfalfa. The sum of the three average acreages for the area is 391 acres. The total average acreage per farm of grazed and harvested



TABLE I  
 PRODUCTION LEVELS PER FARM FOR FARMS  
 ENGAGED IN THE ACTIVITY

County	Crops (Acres/Farm)			(Livestock (Head/Farm))	
	Wheat	Sorghum	Hay	Cows	On Grain
Alfalfa	323	NA*	60	42	NA
Blaine	244	62	47	33	NA
Dewey	209	44	43	45	NA
Garfield	297	53	36	28	47
Grant	378	64	42	NA	NA
Kay	294	85	45	34	32
Kingfisher	253	NA	56	NA	NA
Major	219	65	46	43	140
Noble	243	79	54	42	NA
Woods	347	47	50	57	403
Average	281	62	48	40	156
% of Total	72	16	12		

\* Not Available

Source: U.S. Department of Agriculture (46)

cropland is 436 acres, so most of the production activities for crops appear to be accounted for by the wheat, sorghum and hay activities. The farm used in this study will be 1,280 acres so that large credit requirements may be analyzed. Of the total acreage, 72 percent is in wheat production, 16 percent is in grain sorghum production and 12 percent is in hay production.

Table I also contains census data on livestock production and herds for the study area. For the farms operating cow herds, the average number of cows per farm was 40. Blaine County had the lowest county average at 33 cows per farm, while Woods County was the highest with 57 cows per farm. Over 55 percent of the farms in the area reported owning at least one cow. The statistics for cattle on grain (feed lot) are not very useful, since six counties did not have this data reported. However, Table I shows that Major and Woods Counties have fairly large numbers of cattle on grain.

#### Budgets

Budgets for the enterprises were developed using the OSU Enterprise Budget Generator (29). They were assembled by Oklahoma State Area Extension Specialized Agents for the North Central area of Oklahoma (16).

The livestock activities used in the study include one cow-calf budget and four stocker steer budgets. The cow-calf budget utilizes spring calving and assumes an 88 percent calf crop. Prairie hay and 44 percent protein supplement are fed from November to April and the cows graze native pasture year-round. The calves produced are 460 pound steers and 435 pound heifers. On a per cow basis, .44 steer

calves and .32 heifer calves are produced for sale. The remaining .12 heifer calves are used as replacement heifers. The calves and cull cows are sold in October.

The stocker budgets used in the study include the starting weights, grazing periods and ending weights listed in Table II. Heifers were not included. The stocker budgets use prairie hay and protein supplement as needed from November to March for bad weather. The native pasture is used only in November, and the cattle are put on wheat pasture in December. The activity names (e.g. B002LV13) are those used in the L.P. matrix discussed in the OKFARMS section.

Crop and pasture enterprises were chosen based on the data obtained from the 1978 Census of Agriculture (46) discussed earlier. The crops include wheat, grain sorghum, and alfalfa hay. Two budgets were chosen for each crop to reflect use on two different soil types. Grain sorghum on land Group 3, an Upland soil, produces 20 cwt. per acre. The grain sorghum on land Group 2, a Bottomland soil, produces 24 cwt. per acre. Wheat on land Group 2 yields 32 bu. per acre, while wheat on land Group 3 yields 27 bu. per acre. The alfalfa hay ranges from four cuttings of one ton each on land Group 2 to three cuttings of one ton each on land Group 3.

A small grain grazeout budget was chosen for each land group. The small grain pasture on land Group 3 produces 2.75 animal unit months (AUMS) annually. The small grain pasture on land Group 3 produces 2.45 AUMs per year. The input requirements for both small grain budgets are identical. A native pasture budget yielding 1.38 AUMs per year was chosen for use on land Group 1 (native pasture land).

TABLE II  
STOCKER STEER ACTIVITIES

Characteristic	Activity			
	B002LV13	B003LV13	B004LV13	B005LV13
Buy Weight	275 Lbs.	500 Lbs.	400 Lbs.	400 Lbs.
Buy Date	Nov. 15	Nov. 15	Nov. 15	Nov. 15
Pasture Required				
Small Grain	2.33 AUMS	2.27 AUMS	1.85 AUMS	3.07 AUMS
Native	0.28 AUMS	0.50 AUMS	0.40 AUMS	0.50 AUMS
Prairie Hay	0.15 Tons	0.15 Tons	0.15 Tons	0.15 Tons
Protein Sup.	50.0 Lbs.	50.0 Lbs.	45.0 Lbs.	50.0 Lbs.
Gain per Day				
Buy Date to Mar. 15	1.25 Lbs.	1.40 Lbs.	1.35 Lbs.	1.35 Lbs.
Mar. 15 to Sale	1.75 Lbs.			1.85 Lbs.
Sale Date	May 15	Mar. 15	Mar. 15	May 15
Sale Weight	514 Lbs.	654 Lbs.	553 Lbs.	664 Lbs.
Death Loss	3%	2%	2%	2%

Source: Department of Agricultural Economics (16).

## Resource Situation

### Land

Owned and leased land is available for the case farm. The owned land includes 260 acres of native pasture (land Group 1) and 600 acres of cropland (land Group 2). Four hundred and twenty acres of additional cropland (land Group 3) are rented on an annual basis. Thus, the total land available to the farm is 1,280 acres, or two sections. A relatively large farm was chosen as the case farm due to the fact that a larger farm will sustain larger numbers of cattle. These large numbers of cattle require a substantial amount of capital, making the management of financial alternatives even more important.

The 420 acres of cropland is assumed to be share leased. This is a common leasing arrangement, according to Maynard and Davis (32). The arrangement is based on the landowner paying one-third the cost of the fertilizer and insecticide required for a wheat crop, in return for one-third of the crop.

For example, the cost of fertilizer and insecticide, based on the enterprise budget data, is \$32.50 per acre and the landowner's share is \$10.83. The one-third value of 27 bushels of wheat per acre at a price of \$4.05 per bushel gives the landowner  $\$36.45 - \$10.83 = \$25.62$  per acre. Thus, the net cost per acre to the tenant is \$25.62 and is the rental rate for the cropland used in the L.P. model.

Native and wheat pasture is available from surrounding farms during the winter months and is leased at a rate of \$2.50 per cwt. of animal per month for wheat grazing and \$1.00 per acre for native pasture (31). These values were incorporated into the L.P. model on a dollar per AUM

basis. The costs of leased grazing are \$20.39 per AUM for wheat grazing from November to March, \$22.07 per AUM for wheat grazing from March to May, and \$9.26 per AUM for native grazing during November. Initially, an unlimited supply of rented pasture is assumed available.

### Labor

The operator is assumed to provide 40 hours of labor per week for the entire year. In addition, one family member works 40 hours per week during June, July and August. Part-time labor is hired for a total cost of \$4.00 per hour up to a maximum of 40 hours per week. If additional labor is required, it costs \$5.20 per hour for a maximum of 80 hours per week. The wage of \$5.20 per hour would be equivalent to \$10,000 per year if the laborer were used 40 hours per week.

### Capital

The capital provided by the owner is divided into short, intermediate and long term capital. The short term capital consists of the cash on hand plus borrowing. The average cash income per farm for the state of Oklahoma was used as cash on hand, \$11,638 (47). Short term capital may be borrowed at an interest rate of 12.1 percent. This rate is reported by the Farm Credit Administration (18, p. 25) as the average rate charged by Production Credit Associations on non-real estate loans.

The 12.1 percent interest rate was used in the L.P. model to find a base solution. This solution was then incorporated into the lender survey to determine estimates of lender behavior and interest rates charged. After collecting the results of the lender survey, the average

rate charged by banks will be the rate used for borrowing short term capital in the model.

Intermediate capital provided by the owner consists of the value of the machinery and equipment necessary for the activities included in the base solution. The base solution is thus used to estimate the capital needed. The machinery and equipment were specified in the budgets used in the model. Breeding livestock is included as the intermediate capital and determined by examining the base solution.

The machinery, breeding livestock and equipment necessary for the base solution are shown in Tables III and IV, respectively. The average investment is assumed to be one-half of the total purchase price of the items listed, with the exception of livestock. The total average, intermediate capital provided by the owner is \$98,015.

The long term capital associated with the farm is comprised of the land which is wholly or partly owned. The value of 260 acres of pasture is calculated to be \$400 per acre, based on Farm Real Estate Market Developments (45) and data obtained from OSU Extension Farm Management (15). The 600 acres of cropland are valued at \$1,300 per acre, based on the same sources. The long term capital totals \$884,000.

#### Management

The manager of the farm is assumed to be knowledgeable in both crop and livestock production. His objective is to maximize net returns to the operation. He is able to adjust livestock numbers to utilize the grazing available during the year. The manager has the ability to combine his land, labor and capital resources, and management skills efficiently and carry out the optimal farm plan.

TABLE III  
MACHINERY COMPLEMENT

Machinery Item	Purchase Price
Pickup	\$ 8,100
Trailer	1,350
M.B. Plow	4,320
Tractor - 95 H.P.	25,750
Truck	16,650
Grain Combine - 16 ft.	45,000
Tandem Disk - 14 ft.	3,150
Cultivator - 12 ft.	1,530
Springtooth - 20 ft.	1,800
Drill - 13.3 ft.	3,960
Sprayer	1,080
Field Cultivator - 14 ft.	3,870
Tractor - 55 H.P.	17,250
S.P. Swather	19,800
Spike Harrow	900
PTO Baler	7,020
Bale Loader	<u>1,350</u>
Total	\$162,880
Average Investment	81,440

Source: Department of Agricultural Economics (16)



TABLE IV  
EQUIPMENT COMPLEMENT

Equipment Item	Purchase Price
4-Wire Fence (8 miles)	\$16,500
Water Tank (1100 gal.)	358
Tank Heater	275
Portable Corral	1,031
Port. Load Chute	756
Working Chute	<u>1,031</u>
Total	19,951
Average Investment	9,975
Breeding Livestock	
Beef Cows	5,600
Bull	<u>1,000</u>
Total	6,600
Total Equipment Investment	16,575

Source: Department of Agricultural Economics (16)

## Prices

Cattle prices were derived using a base point method (19), while crop and input prices were based on Oklahoma Enterprise Budgets Price Vectors (14). The base animals used to determine the cattle prices are 400 to 500 pound #1 feeder steers. Table V shows the type of cattle for which prices are needed, their five year average price and the ratio of each price to the base steer price. A projection by Ikerd was used as the base price of 400-500 pound steers, and prices of the remaining cattle are estimated by weighting the base steer price by the value in the percent of base column (25). For example, the price of the 600 to 700 pound feeder steers is found by multiplying 82.87 percent times the base steer price of \$85.51, which equals \$70.86, the projected price.

The annual cattle prices must be weighted by monthly seasonal indices to determine the monthly prices used in the model. The monthly indices and resulting prices used in the L.P. model are shown in Table VI for feeder cattle. This base point method is useful since the prices derived from it are weighted according to monthly price movements as well as the relationship which exists among prices of the various animals.

## OKFARMS

A solution for the optimal farm plan is achieved using a program developed at Oklahoma State University for use in whole farm analysis (28). The program is called OKFARMS (Oklahoma Farm and Ranch Management System), and is to be used in education, research, and extension.

TABLE V  
FIVE-YEAR AVERAGE PRICES AND PROJECTED  
PRICES OF CATTLE

Cattle and Calves	5-Year Avg. (\$)	% of Base	1981 Projection (\$)
Feeder Steers #1 600-700 Lbs.	47.53	82.87	70.86
*Feeder Steers #1 400-500 Lbs.	57.35	100.00	85.51
Feeder Heifers #1 500-600 Lbs.	44.86	78.22	66.85
Bulls YG 1, 1500-2100 Lbs.	41.02	71.53	61.17
Cows Commercial 2-4	31.81	55.47	47.43

\* Base Steer

Source: Blakely (13) and Ikerd (25).

TABLE VI  
MONTHLY AVERAGE INDICES AND PRICES  
OF FEEDER CATTLE

Month	Steers				Heifers	
	600-700 Lb.		400-500 Lb.		500-600 Lb.	
	Index	Price	Index	Price	Index	Price
Jan	93.9	66.54	92.6	79.18	91.6	61.22
Feb	98.5	69.80	97.3	83.20	97.3	65.03
Mar	102.3	72.49	103.0	88.08	101.8	68.03
Apr	108.4	76.81	110.6	94.57	110.2	73.66
May	106.9	75.75	109.6	93.72	108.6	72.58
Jun	103.3	73.20	103.6	88.59	106.1	70.91
Jul	100.5	71.21	99.4	85.00	102.2	68.30
Aug	98.5	69.80	99.5	85.08	99.6	66.56
Sep	99.1	70.22	99.7	85.25	99.3	66.36
Oct	94.8	67.18	94.1	80.46	94.4	63.09
Nov	95.3	67.53	94.2	80.55	92.9	62.09
Dec	98.4	69.73	96.3	82.35	95.9	64.09

Source: Blakely (13).

It provides many flexibilities in inputting procedures and presents an easily interpreted L.P. solution. The system is compatible with the OSU Enterprise Budget Generator.

The input required by OKFARMS consists of the resource situation of the farm under consideration and the budgets chosen for production activities. The input options include rental rates and agreements, capital arrangements, grazing purchase options, irrigation systems, transfer rows and activities and prices. The budgets used may be chosen from existing budgets (16) or constructed by the user.

The OKFARMS program includes two major steps. The first step of the program builds the budgets and identifies the resource situation specified by the user. This information is then used by the program to generate a linear programming matrix. Code names are assigned to each row and column based on the enterprise budget generator codes and the nature of the vector. For example, the activity SL001301 is a sell activity (SL) for stocker steers (item code 13). The generated matrix is solved using an MPSX program developed by IBM (24). MPSX also gives information on the effects of changing the solution in the RANGE output.

The second step of OKFARMS uses a Fortran program to rewrite the SOLUTION and RANGE values in a form which may be easily read. The code names are translated back to word names, and a summary of the solution is printed. The values from RANGE are used to describe price and activity level ranges. Within any given price or activity range, the mix of enterprises in the solution will not change. Any deviation of a price or activity outside of its' range will result in a new solution. This information is useful in analyzing changes in prices or activities constrained by the user, such as a maximum of 100 steers.

The final solution and price ranges obtained from OKFARMS may be interpreted with no knowledge of MPSX. The detailed summary of the solution is therefore useful in extension and education projects, since the output is understood by the user with little or no training.

For this study, only the first portion of OKFARMS was used. The resources and budgets previously discussed were used by OKFARMS to solve the generated matrix. The solution and range output were then obtained without going on to the second portion of the program. Changes in the matrix are easily accomplished using a REVISE data set of MPSX procedures. This technique proved to save both time and money. The REVISE data set was used to introduce the credit row and activity, and obtain an optimal solution with respect to credit constraints.

#### Credit Modifications

One objective of this study is to incorporate liquidity management strategies into the linear programming model of the case farm. To achieve this, the matrix needs to provide a means to reflect the credit absorption by production activities and value of credit in reserve.

Figure 6 presents a submodel of the L.P. model for the case farm used in this study. The land, labor, and capital rows represent the resources provided by the owner. They are constrained by the right hand side (RHS) values,  $b_i$ . Additional labor may be obtained through the labor hire column, and capital may be borrowed in the borrow capital column. The produce column represents the crop and livestock production activities. The production is transferred to the buy/sell column using the transfer row. The objective of the model is to maximize returns.

Row	Produce	Sell	Labor Hire	Borrow Capital	Reserve Credit	Relation	RHS
Land	$A_n$					=	b
Labor	$B_n$		-1			$\leq$	b
Capital	$C_n$			-1		$\leq$	b
Credit	$a_n$				1	$\leq$	c
Transfer	$-T_n$	1				$\leq$	0
Obj. 1	$-E_n$	$P_n$	$-P_L$	$-P_c$	$r_p$	=	Max.

Figure 6. Submodel of Linear Programming Model Used in Study

The credit row contains positive  $a_n$  coefficients in the produce column. These coefficients are the rates at which the production activities "use" credit. The credit row also shows that credit may be used in the reserve credit activity column. This column withholds credit from use in production activities and acts as a liquidity reserve. The reserve credit column has a positive objective function value,  $r_p$ , to reflect a positive valuation of the liquidity reserve.

The credit row is based on an equation which is determined as follows. Assume farmers (or lenders) impose limits on the debt (D) to equity (E) ratios of farms, such that

$$\frac{D}{E} \leq X_1 \quad (10)$$

where  $X_1$  is a positive number. For the initial solution of the L.P. model,  $X_1$  is assumed to be equal to two. This is a fairly typical limit placed on farmers by real estate lenders, according to Barry, Hopkin, and Baker (10). Since equity is equal to the difference between assets (A) and debt, equation (10) may be restated as

$$D \leq 2(A-D) \quad (11)$$

after substituting in a value of two for X. Reducing equation (11) results in

$$D \leq .667A \quad (12)$$

This equation applies to production activities as well as existing balance sheet items of the farm, since the credit available must be allocated among both.

Production activities are both a source and use of credit and the "asset values" (P) associated with production must be incorporated into equation (12). The production activities use credit in financing inputs



and generate credit due to the asset value of the inputs. To illustrate, stocker cattle purchases may be financed using debt, while at the same time the cattle are assets which increase credit. Equation (12) thus becomes

$$D + P \leq .667 (A+P) \quad (13)$$

The value .667 is rounded to .65 for ease in use and calculation, and equation (13) is reduced to

$$.35 P \leq .65A - D. \quad (14)$$

This is the credit equation used in the model farm.

Equation (14) shows that the "asset values" of production activities must be scaled by a factor of .35 in the credit row, or

$$a_n = .35 P_n \quad (15)$$

This equation is highly simplified, however, in that it assumes lenders finance a constant percentage of the "asset value" of production activities. Also, equation (15) assumes that lenders finance the same amount for all production activities, when in fact different enterprises likely have varying credit rules. The lender survey will be used to investigate the validity of these assumptions.

The right hand side value of equation (14) is the difference between .65A and D, which is equal to the credit available to the farm based on a given balance sheet. Production activities are subject to the restriction that the amount of credit they use in total is less than or equal to the credit reserve of the farm plus the amount the enterprise generates. Also, as shown in Figure 6, credit not used in production may be left in reserve through the reserve credit column, which places a positive value on the reserved credit.

To apply equation (14) to the L.P. model requires values of  $P$ . These values were obtained from the crop and livestock budgets used in the OKFARMS program. In the case of the livestock activities, the funds necessary for production of cattle were assumed to include all cash operating costs, plus the value of the animal purchased. Table VII illustrates the costs included in the credit determination of livestock activities. The scale factor of .35 is obtained from equation (14). This factor implies that costs ( $P$ ) incorporated into the steer have a security value which enhances credit availability by .35  $P$ . The values for each activity in the "Coefficient" row of Table VII are the values used in the credit row for the respective activities. In the cow-calf activity (B001LV11) steer calves are not purchased, and so are not included in the determination of the coefficient. The remaining activities are stocker activities described earlier in Table II.

An important point to note in Table VII is that time is not taken into account in the credit row. The coefficients for B004LV13 and B005LV13 are almost identical despite the fact that the steers from B004LV13 are sold in March, while those in B005LV13 are not sold until May. The credit is thus tied up in any activity for an entire production year even though it is only used part of the year. A multiperiod model utilizing monthly periods could possibly be used to circumvent this problem. In this type of model, credit would only be tied up during the months it was used.

The determination of credit coefficients for crop activities was made similarly to the livestock coefficients. Table VIII identifies the names of the crop activities as shown in the L.P. matrix, and illustrates the derivation of the coefficients for the credit row. The sale value

TABLE VII  
CREDIT ROW COEFFICIENTS FOR LIVESTOCK ACTIVITIES

Item	B001LV11	B002LV13	B003LV13	B004LV13	B005LV13
Steer Calf		221.27	402.30	321.84	321.84
Salt and Min.	2.69	1.63	1.13	1.13	1.63
Protein Suppl.	47.35	7.00	7.00	6.30	7.00
Starter Feed		4.80	4.80	4.80	4.80
Vet. and Med.	4.48	6.00	4.00	5.00	4.00
Mach. and Eqpt.	<u>12.76</u>	<u>3.29</u>	<u>2.41</u>	<u>2.41</u>	<u>3.29</u>
Total ( $P_n$ )	67.28	243.99	421.64	341.48	342.56
Scale Factor	<u>35%</u>	<u>35%</u>	<u>35%</u>	<u>35%</u>	<u>35%</u>
Coefficient ( $a_n$ )	23.55	85.39	147.57	119.52	119.90

Source: Department of Agricultural Economics (16)

TABLE VIII  
CREDIT ROW COEFFICIENTS FOR CROP ACTIVITIES

Name	B0060273	B0140373	B0070276	B0080376	B0090281	B00100381	B0120289	B0130389
Crop	Grain Sorghum	Grain Sorghum	Wheat	Wheat	Alfalfa Hay	Alfalfa Hay	Small Grain Grazeout	Small Grain Grazeout
Land Class	2	3	2	3	2	3	2	3
ITEM								
Seed	3.75	3.75	5.00	5.00	5.60	5.60	5.00	5.00
Fertilizer	13.50	13.50	13.50	13.50	33.20	33.20	13.50	13.50
Nitrogen	8.37	8.37	10.00	10.00			10.00	10.00
Insecticide	1.25	1.25	4.50	4.50	18.00	18.00		
Baling Wire					12.00	9.00		
Fert. Spreader	2.25	2.25	4.50	4.50	2.70	2.70	4.50	4.50
Mach. & Eqpt.	12.71	12.71	13.60	13.60	30.80	23.93	10.49	10.49
Sale Value	132.00	110.00	129.60	109.35	300.00	225.00		
Total	173.83	151.83	180.70	160.45	402.30	317.43	43.49	43.49
Avg. Value ( $P_n$ )	86.92	75.92	90.35	80.22	201.15	158.71		
Scale Factor	35%	35%	35%	35%	35%	35%	35%	35%
Coefficient ( $a_n$ )	30.42	26.57	31.62	28.01	70.40	55.55	15.22	15.22

Source: Department of Agricultural Economics (16)

of the crops is included in the determination of credit coefficients to reflect the credit generated by growing crops. Crops differ from cattle in that the crop actually has no value until production is complete, while the stocker cattle are treated as assets during their entire production process. To reconcile this difference, the average value of the crops are used to determine the crop credit coefficients.

The average value of the crop is found by totalling all production costs, adding to this the expected sale value of the crops, and dividing by two. This average value is then multiplied by .35 to finally arrive at the coefficients for the crops. This process is illustrated in Table VIII. The small grain grazeout crops do not have an expected sale value as such, and therefore cost was used in their cases.

After estimating the credit coefficients for the crop and livestock activities, the right hand side value of equation (14) was determined using a hypothetical balance sheet of the case farm. The assets of the farm totalled \$1,053,459 and the total liabilities were assumed to be \$551,748. The right hand side value is thus,

$$.65 (\$1,053,459) - \$551,748 = \$133,000 \quad (15)$$

according to equation (14). This value along with the credit coefficients was added to the L.P. matrix by means of the credit row. The objective function value of the reserve credit column was initially set very low at \$0.01. The resulting modified matrix was solved, and its' solution used as a base solution.

#### Base Solution

The completed L.P. matrix is shown in Appendix A and the solution is summarized in Table IX. The solution shows 851.5 head of stocker

TABLE IX  
SUMMARIZED BASE SOLUTION

Name	Activity	Level
B001LV11	Cow-Calf	20.0 Head
B005LV13	Stocker Steers	851.5 Head
B0060273	Grain Sorghum	160.0 Acres
B0070276	Wheat	29.7 Acres
B0080376	Wheat	420.0 Acres
B0090281	Alfalfa Hay	120.0 Acres
B0110185	Native Pasture	260.0 Acres
B0120289	Grazeout	290.3 Acres
LHIRE100	Hire Labor 1	1,760.0 Hours
LHIRE200	Hire Labor 2	2,509.1 Hours
CAPIBOR1	Borrow Ann. Capital	157,756.5 Dollars
CREDRES1	Reserve Credit	0.0 Dollars
AUMRENT1	Rent Wheat Past.	811.3 AUM
AUMRENT2	Rent Wheat Past.	552.3 AUM
AUMRENT3	Rent Wheat Past.	118.2 AUM
RENTNAT5	Rent Native Past.	341.3 AUM
HAYTRAN1	Feed Own Hay	131.3 Tons
OBJJ		101,622.9 Dollars

steers grazing a combination of wheat pasture, native pasture, small grain grazeout, and rented pasture. Hay produced in the alfalfa hay activity is fed to the steers during bad weather in the winter months. All available land is used, as well as all of the operator labor hours.

The two labor hire activities are used to reflect two wage rates, as discussed earlier. LHIRE1 is the part-time labor hired during the year at a wage rate of \$4.00. LHIRE2 is the full-time labor hired at \$5.20 per hour. The rented wheat pasture is divided into three periods. Wheat pasture rented in AUMRENT1 is available from November to February; for AUMRENT2, it is available in March and April. AUMRENT3 is available only during May. The rented native pasture, RENTNAT5 is used during October.

On the basis of census data, grain sorghum and alfalfa hay were found to account for 16 percent and 12 percent of cropland, respectively (see Table I). Upper limits were placed on grain sorghum and alfalfa hay, at levels consistent with the census data (46). Thus, with approximately 1000 acres of cropland available, the upper limit for grain sorghum was set at 160 acres and the upper limit for alfalfa hay was set at 120 acres.

The credit reserve activity did not enter the solution. All credit was used by production activities. By examining the range output of the MPSX output, the shadow price of reserved credit was found to be \$0.273. A reservation price on credit of \$0.273 would result in \$29,715.50 of credit being held in reserve under assumptions for this farm. At any reservation price less than \$0.273, the solution would not change. The price range of CAP1BOR1 was found in the range output

to be from 30.5 percent to 5.2 percent. The input cost used for borrowing annual capital is 12.1 percent, so a substantial increase in the cost of borrowed capital must occur before the solution would change. Should the cost of borrowing annual capital rise to 30.5 percent, the credit reserve activity would enter the solution and CAP1BOR1 would decrease to \$115,347.63.

This solution will be referred to as the "base solution" for the case farm and used in the lender survey as the projected farm plan for the coming production year. Income and balance sheets along with cash flow projections presented to the bankers were all based on this solution.



## CHAPTER IV

### LENDER SURVEY AND RESULTS

The questions raised in earlier chapters about lender crop and livestock lending practices need to be answered for use in the linear programming model. Estimates of lender behavior were obtained by surveying 32 agricultural lenders in Oklahoma. The survey consisted of two parts. A personal interview was conducted to elicit the institutions' and lenders' views on agricultural lending practices. Following the interview, the lender was asked to respond to six case studies depicting the case farm (base solution) under various income and equity situations. The respondents then returned the completed surveys by mail. The survey and the methods used in developing it are described in this chapter and results of the survey are then examined in detail.

#### Interview Survey

The interview portion of the lender survey is shown in Figure 7. Questions one through four request background information about the lender and the bank. Bank deposits were obtained for later use in determining whether the size of the bank was a factor affecting loan requests. The educational and agricultural background of the lender also was hypothesized to influence loan decisions and information was obtained. Answers to the fifth question was an indicator of the bank's

## Department of Agricultural Economics

Oklahoma State University

## LENDER SURVEY

Date \_\_\_\_\_

1. Name \_\_\_\_\_ Title \_\_\_\_\_
2. Name of Bank \_\_\_\_\_  
Deposits \_\_\_\_\_
3. Lending Responsibilities \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Agricultural Background \_\_\_\_\_  
\_\_\_\_\_  
Educational Background \_\_\_\_\_
5. What Percent of your bank's total net loans are agricultural loans?  
\_\_\_\_\_ Outlook for the future of agricultural loans?  
( ) Increase      ( ) Remain the Same      ( ) Decrease
6. Rank agricultural lending from the point of view of:
  - A. The risk involved:  
( ) High Risk      ( ) Moderate Risk      ( ) Low Risk
  - B. Profitability:  
( ) Highly Profitable      ( ) Moderately Profitable      ( ) Low Profit
7. Experience with Stocker Loans \_\_\_\_\_
8. Describe your lending practices for stocker cattle to go on wheat pasture.
  - A. Rules of thumb on: \_\_\_\_\_

Figure 7. Interview Survey

1. Financial statements or documentation necessary \_\_\_\_\_  
\_\_\_\_\_
2. Collateral Required (Cattle purchased?) \_\_\_\_\_  
\_\_\_\_\_
3. Stocking Rates, Number of Cattle \_\_\_\_\_  
\_\_\_\_\_
4. Describe any other requirements (such as pasture available,  
hedging, contracting) \_\_\_\_\_  
\_\_\_\_\_
5. Percent Financed \_\_\_\_\_  
Based on ( ) cash cost ( ) expected sale value ( ) other  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. How would you describe your lending practices for crops?  
A. Rules of thumb:
  1. Percent Financed \_\_\_\_\_  
Based on ( ) cash cost ( ) expected sale value ( ) other
  2. Collateral Required \_\_\_\_\_  
\_\_\_\_\_
  3. Financial statements or documentation necessary \_\_\_\_\_  
\_\_\_\_\_

Figure 7. Continued

current and future outlook on agricultural loans. It reflects the commitment the bank has to agricultural lending, which affects lending practices.

Question six concerns the lender's assessment of the risk and profitability of agricultural lending. The lenders were asked to rank agricultural lending in comparison with their other lending. The seventh question was asked to insure that the lender was familiar with stocker cattle operations.

Lending practices for stocker cattle are examined in question eight. The lender was asked to describe his general lending practices including the documentation necessary, collateral required, and stocking rates used in assessing loans. Additional requirements such as hedging or forward contracting were discussed in examining the lender's risk management strategies. The final question concerning stocker cattle dealt with the percent of the cattle the lender finances. The percent financed could be based on cash cost, expected sale value, a combination of the two, or some other value. Following the question covering stocker cattle, ample space was allowed for comments or explanations by the lenders.

The final question in the interview deals with crop loans. The intent was to obtain the lenders' risk management strategies for crop loans, and compare these to the lending rules applied to stocker cattle. However, this question proved to be of questionable value. Few specific crop loans were made by the banks surveyed for crop loans, defined as loans which take a lien on growing crops as collateral. Most banks surveyed included funds for crops in an operating line of credit, and used machinery and equipment as collateral. One possible

explanation of credit lines being used is that the higher valued machinery and equipment supports a larger loan than a lien on growing crops. The farmer can thus obtain a larger loan while the bank is in a more secure position.

Alternative forms of questions would be desirable for future attempts to estimate the percent of crops financed by lenders. One aspect of lending for crops not considered is whether the percent financed would change among various crops, such as wheat versus grain sorghum. Future studies might attempt to incorporate this idea into crop financing projects.

#### Written Survey

The written portion of the lender survey is shown in Appendix B. It includes an introduction to the survey, a biography of the case farm, and six case studies. One written survey was left with each lending officer along with a stamped, self addressed return envelope. The lender was asked to complete the survey and return it at his convenience.

The six case studies were all based on the optimal solution to the L.P. model of the case farm. The stocker loan request is the same in each case, and is shown on the first page of Figure 8, which contains Case A. The prices and amounts of the cattle and operating inputs were obtained from the base solution. The lender was asked to report the bank's "prime rate" and the rate charged on the stocker loan so that the interest margin could be found. The loan officer was asked to evaluate the loan request based on the accompanying financial statements for each case. Collateral requirements, loan maturities, payment types, and applicable conditions for the loan were requested to determine

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

LOAN REQUEST  
September 1, 1981  
Case A

1. Using the financial statements for Case A, examine the following loan request and indicate the loan granted for the coming production year.

A. Stocker Steers - The steers will be purchased on November 15, and will graze on wheat pasture from January until they are sold in May.

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	400	80.55	274,192.20	_____

B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

<u>C. Total -</u>	<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
	291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_

Figure 8. Written Survey, Case A

BALANCE SHEET  
September 1, 1981

Case A

<u>Current Assets</u>		<u>Current Liabilities</u>	
Cash	<u>11,638</u>	Interest Payable on	
Leased Land	<u>10,760</u>	Intermediate Notes	<u>2,332</u>
Cash Value Life Insurance	<u>10,550</u>	Long Term Loans	<u>37,803</u>
Stored Crops:		Notes Payable	<u>0</u>
Wheat	<u>19,664</u>	Principal Payments Due on	
Alfalfa Hay	<u>9,848</u>	Intermediate Notes	<u>2,395</u>
Livestock to be Sold:		Long Term Loans	<u>2,526</u>
Calves - Hfrs.	<u>1,824</u>	TOTAL CURRENT LIABILITIES	<u>45,056</u>
Stra.	<u>3,522</u>		
Cows	<u>875</u>	<u>Intermediate Liabilities</u>	
Feed, Seed, Fertilizer	<u>2,813</u>		
TOTAL CURRENT ASSETS	<u>71,444</u>	Machinery and Equipment	
		Notes	<u>17,038</u>
<u>Intermediate Assets</u>		CCC Loans	<u>19,664</u>
Breeding Livestock	<u>6,600</u>	TOTAL INTERMEDIATE LIABILITIES	<u>36,702</u>
Machinery and Equipment	<u>91,415</u>	<u>Long Term Liabilities</u>	
TOTAL INTERMEDIATE ASSETS	<u>98,015</u>	Land Loans	<u>470,010</u>
		TOTAL LIABILITIES	<u>551,768</u>
<u>Fixed Assets</u>		NET WORTH	<u>501,691</u>
Land (including buildings)		TOTAL LIABILITIES AND NET WORTH	<u>1,053,459</u>
Pasture	<u>104,000</u>		
Class I + II	<u>780,000</u>		
TOTAL FIXED ASSETS	<u>884,000</u>		
TOTAL ASSETS	<u>1,053,459</u>		

Figure 8. Continued

## INCOME STATEMENT

## Case A

<u>Receipts</u>				<u>1981</u>	<u>1982 (Projected)</u>			
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>
	20	220	3.20	19,664		32	30	4.05
Wheat	27	230	3.65	22,722	Wheat	27	420	4.05
Hay	4	87	70.00	24,360	Hay	4	120	75.00
Grain Sorghum	24	160	4.95	19,008	Grain Sorghum	24	160	5.50
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>
Calves - Steers	9	4.60	74.80	3,097	Calves - Steers	9	4.60	80.46
Heifers	6	4.35	58.83	1,535	Heifers	6	4.45	64.77
Stockers	301	5.14	68.80	106,443	Stockers	851	6.64	75.75
Cows	2	9.50	41.79	794	Cows	2	9.50	46.01
					Bulls	1	3.20	57.81
Total Receipts				197,623	Total Receipts			
<u>Expenses</u>								
Operating Expenses				118,939	Operating Expenses			
Interest Expenses					Interest Expenses			
Real Estate				37,990	Real Estate			
Machinery				2,588	Machinery			
Operating Loan				5,902	Operating Loan			
Total Cash Expenses				165,419	Total Cash Expenses			
Net Cash Income				32,204	Net Cash Income			
Depreciation				9,802	Depreciation			
Net Income				22,402	Net Income			
Income Taxes (Federal and State)				4,191	Income Taxes (Federal and State)			
Income After Taxes				18,211	Income After Taxes			
Family Living Expense				12,000	Family Living Expense			
Retained Earnings				6,271	Retained Earnings			

Figure 8. Continued



PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case A

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	40,135	0	0	0	0	0	0	0	0	0	0	0	40,135
Principal Payment (land and machinery)	4,921	0	0	0	0	0	0	0	0	0	0	0	4,921
Total Cash Outflow	72,541	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	487,545
Cash Difference	-63,356	7,916	-288,119	-4,666	-4,380	-17,836	-21,335	-5,462	420,956	49,526	-18,150	-1,166	53,829
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	12,706	62,232	44,082	
Cash Position	-51,718	8,316	-287,719	-4,266	-3,980	-17,436	-20,935	-5,062	421,256	62,232	44,082	42,916	
Money Borrowed This Period	52,118	0	288,119	4,666	4,380	17,836	21,335	5,462	0	0	0	0	393,916
Principal Paid on Operating Loan	0	7,391	0	0	0	0	0	0	386,525	0	0	0	393,916
Interest Paid on Operating Loan	0	526	0	0	0	0	0	0	22,025	0	0	0	22,550
Ending Cash Balance	400	400	400	400	400	400	400	400	12,706	62,232	44,082	42,916	Final Cash Balance 42,916
Accumulated Borrowing	52,118	44,727	332,512	337,512	341,892	359,728	381,063	386,525	0	0	0	0	Maximum Accumulated Borrowing 386,525

Figure 8. Continued

which (if any) non-price risk management strategies were used by lenders. Space for lender comments was allowed at the end of the loan request.

The financial statements accompanying the cases include a balance sheet, income statement, and cash flow sheet, shown in Figure 8. The statements were compiled as of September 1, 1981, to coordinate with the timing of stocker activities. The survey was administered during the peak period of stocker lending.

The balance sheet assets were derived from the resource situation assumed for the farm and discussed in Chapter III. The intermediate assets are based on machinery and equipment complements shown in Tables III and IV. Land values used are typical for the area. Current assets are determined primarily from the optimal solution given previously in Table IX. The feed, seed and fertilizer and livestock to be sold are the amounts on hand on September 1 according to the budgets used in the study.

The fertilizer on hand consists of the lime, phosphate, and potash needed to fertilize 120 acres of alfalfa hay. No feed is stored on farm in September. The livestock to be sold include nine steer calves, six heifer calves and two cull cows, all to be sold in October. The alfalfa hay stored is sufficient to feed the cattle in the proposed farm plan. One half of the wheat harvested in the previous year is assumed to be entered in the regular CCC loan program at a loan rate of \$3.20 (33). The leased land is included as an asset, since it was assumed prepaid in July (1).

The balance sheet liabilities were chosen to reflect the desired financial condition of the case farm. For example, the impact of highly leveraged positions on stocker loans was obtained by comparing

the loan granted in Case A with Case C. Both cases contained the same balance sheet assets, but the liabilities of Case C were much larger than Case A. Thus, liabilities could be manipulated to show various current and equity positions. The net worth of the farm is calculated by taking the difference between total assets and total liabilities.

The income statements used in the six case studies were also based on the optimal farm solution reached in Chapter III. Both past and projected income statements were prepared. The previous year's statement was based on a feasible farm plan using no rented wheat pasture. Receipts and expenses were based on the budgets included in the farm plan and the current liabilities of the balance sheet. Depreciation was assumed to be 10 percent of the value of machinery and livestock. Federal taxes were calculated from 1980 tax tables, and state taxes were set at six percent of net income. Family living expenses were assumed to be \$1,000 per month.

A projected cash flow statement was also included with each case. The cash flow was developed using data from the budgets included in the farm plan, the income statement and the balance sheet using a computerized cash flow program (37). The cash flow was computed for the period from September 1981 to August 1982. The ending cash balance and maximum accumulated borrowing values are included in the cash flow.

The six cases presented in Table X depict several financial situations. The current ratios range from a high of 1.58 to a low of 0.50. Leverage ratios range from a conservative 1.10 to a highly leveraged ratio of 1.91. The additions to retained earnings for the previous year are all positive with the exception of Case D, which shows a decrease in retained earnings. The projected additions to retained

TABLE X  
SUMMARY OF CASES USED IN THE LENDER SURVEY

<u>Case</u>	<u>Current Ratio</u>	<u>Leverage Ratio</u>	<u>Addition to Retained Earnings, 1981</u>	<u>Addition to Retained Earnings, 1982</u>
A <sup>1</sup>	1.58	1.10	6,271	16,397
B <sup>2</sup>	1.36	1.40	6,271	12,933
C <sup>3</sup>	0.65	1.91	220	8,200
D <sup>4</sup>	0.50	1.94	-16,939	7,469
E <sup>5</sup>	0.75	1.91	199	13,510
F <sup>6</sup>	1.36	1.40	6,271	12,933

<sup>1</sup>Case A.

Cattle loan requested  
Low leverage ratio  
High current ratio  
Positive cash balance  
Positive expected cash balance

<sup>2</sup>Case B

Cattle loan requested  
Combine loan requested  
Moderate leverage ratio  
Moderate current ratio  
Positive cash balance  
Positive expected cash balance

<sup>3</sup>Case C

Cattle loan requested  
High leverage ratio  
Low current ratio  
Positive cash balance  
Positive expected cash balance

<sup>4</sup>Case D

Cattle loan requested  
High leverage ratio  
Low current ratio  
Negative cash balance  
Positive expected cash balance

<sup>5</sup>Case E

Cattle loan requested  
High leverage ratio  
Low current ratio  
Positive cash balance  
Positive expected cash balance  
No previous experience with cattle

<sup>6</sup>Case F

Cattle loan requested  
Land loan requested  
Moderate leverage ratio  
Moderate current ratio  
Positive cash balance  
Positive expected cash balance

earnings are all positive. Case B includes a request for a combine loan, and Case F requests a land loan. The manager of the case farm is assumed to have no experience with cattle production in Case E. Brief summaries of all cases are contained in the footnotes to Table X.

The cases are set up such that paired comparisons may be made (40). Comparing Case A to Case B will show the effect a capital loan has on the stocker loan. Case A versus Case C will be used to test the effect that higher leverage situations have on stocker loans. Case C compared to Case D will show the impact recent income experiences have on the loan requested. Case A versus Case E will show the effect experience with cattle has on a loan to purchase stocker cattle. Finally, Case B compared to Case F will demonstrate the impact a land loan request has on a stocker loan.

The survey was administered to 32 banks, primarily in North Central Oklahoma. Joe Williams, an El Reno banker, made helpful suggestions concerning the survey, and supplied a list of Oklahoma bankers attending recent Oklahoma Banker's Association Agriculture Conferences (51). From this list, the banks located in or near the area of study were chosen to be surveyed.

The banks in the sample were contacted, and appointments were made for personal interviews. The lender was first given some brief background information about the study. The oral survey was covered next, and all pertinent information was recorded. At the conclusion of the oral survey the lender was given the written survey and asked to examine it. Any questions concerning the survey were answered, and the interview was concluded.

## Interview Results

The survey responses were aggregated to maintain anonymity among the individual lenders. The deposits of the institutions surveyed ranged from seven million dollars to one and one half billion dollars. The banks were separated into three sizes for analysis, and are shown in Table XI, as Class I, II and III.

The percentage of the banks' total net loans which were agricultural loans averaged 42 percent for all banks. The range of these values was from a low of one-half of one percent to a high of 90 percent. The breakdown of average percentages which agricultural loans comprise by size of bank is shown in Table XI. The smaller bank class has a much larger percentage of loans in agriculture than the large bank class.

The average percent of stocker cattle financed by all banks is 83 percent. The individual response ranged from 50 percent to 100 percent. The Class II banks appear most liberal in stocker lending, averaging 87 percent. The Class I and III banks lend approximately the same percentages, averaging 80 and 78 percent, respectively. Fifty-three percent of the banks surveyed required only the cattle as collateral for their stocker loans. The remaining 47 percent required machinery and equipment plus the cattle purchased as collateral. Collateral requirements were distributed approximately the same within the three ranges of bank size.

The financial statements required by the banks varied widely among all banks and within the size categories. Fifty-six percent of all banks surveyed examine only net worth statements in evaluating stocker loans. Both net worth and cash flow statements are required by 28 percent of the banks. Only six percent require income statements, while

TABLE XI  
BANK CHARACTERISTICS AND PRACTICES<sup>1</sup>

Name	Deposits (Millions of Dollars)	Number of Banks	Agricultural Loans (Avg. % of Total)	Stocker Loans <sup>2</sup> (Avg. % Financed)	Crop Loans <sup>3</sup> (Avg. % Financed)
Class I	Under 25	11	58	80	86
Class II	25-99	13	47	87	76
Class III	100 and over	<u>8</u>	<u>12</u>	<u>78</u>	<u>61</u>
All Banks		32	42	83	76

<sup>1</sup>All percentage values rounded to the nearest whole percent.

<sup>2</sup>Based on cash costs of the cattle.

<sup>3</sup>Based on cash costs of crops.

nine percent do not examine any type of financial statement. Financial statements appear to be of more importance to Class III banks.

Eighty-eight percent of the Class III banks utilize net worth and cash flow statements, while only eight percent of the Class I and II banks require only net worth statements. The nine percent of all banks which do not use financial statements are all in the Class I and II categories. One explanation of the differences in financial statements required may be that large banks are not as personally involved in farming operations as the small banks. Some loans may be through correspondent banks, so that the bank may be unfamiliar with the borrower. Additional financial statements are thus required in evaluating the credit worthiness of the borrower.

Stocking rates were determined by the farmers, and not the banks, almost without exception. The typical responses to this question were that the lending officers did not want to become involved in management of the farms. Stocking rates were therefore left up to individual farmers. The most common requirement imposed by lenders is that the borrower have good wheat pasture and ample hay and feed. A few require large producers to hedge their cattle. Based on the opinions of the lenders very few producers hedge or forward contract their cattle. Cattle inspections are done by all banks except the large correspondent banks. Most stocker loans made by the large Class III banks are in correspondence with rural banks and the cattle inspections made for these loans are carried out by the rural banks.

Crop loan percentages are shown in the final column of Table XI. As discussed earlier, these values were difficult to determine due to inclusion of loans for crops in operating lines of credit.



Approximations of the percent which would be granted for an actual crop loan were made by lenders and these are summarized for the average crop loan percentages. Class I banks lend the largest percentage, followed by Class II and then Class III banks. The Class III banks seemed opposed to making crop loans. The average crop loan granted by all banks was 76 percent of the amount requested.

Eight banks stated they would accept a lien on growing crops as the only collateral for crop loans. All remaining banks took a lien on growing crops in addition to machinery, equipment, and livestock for collateral. Most lenders felt a lien on growing crops was too insecure, and thus more collateral was required. The same financial statements used in stocker loans were also used for crop loans by all banks surveyed.

An important point to note in Table XI are the percentages financed for stocker and crop loans by all banks. The banks were willing to finance an average 83 percent of the cost of the cattle only. Most lenders stated they did not finance operating inputs for stockers. Most lenders based their loans on the input costs of the crops, and not the value of the growing crops. However, five banks did use a breakeven analysis or projected income statement in evaluating both stocker and crop loans. This shows that crops and cattle are sources of asset value, and they both contribute to and use credit.

The lenders' views on agricultural lending are summarized in Table XII. Fifty-nine percent of all lenders felt that agricultural lending was low risk. The reasons given to justify this were (a) low chargeoffs and (b) high levels of owner equity. Agriculture was ranked as a low risk by 64 and 69 percent of the Class I and II banks. Only

38 percent of the lenders in Class III banks rated agricultural lending as low risk. The remaining 62 percent felt that moderate or high risk better described agricultural lending.

Agricultural lending was judged to be low in profitability by 47 percent of all surveyed lenders, and moderately profitable by 44 percent of the lenders. The reason most often cited for the low profit ranking was the low level of compensating (minimum) balances held by farmers. Fifty-five percent of Class I bank lenders felt the profit in agricultural lending was low and 45 percent rated it high. Profitability was felt to be low by 15 percent of the lenders from Class II banks and moderate by 69 percent of these lenders. Sixty-three percent of the Class III bank lenders ranked agricultural lending in low profitability.

Fifty percent of all lenders surveyed expected agricultural lending as a percentage of total lending to remain the same in the future. A majority of the lenders in Class II banks expect agricultural lending to decrease. They expect energy lending to increase as a portion of total lending and thus agricultural lending will fall.

The oral survey may be summarized based on Tables XI and XII as follows. Class I banks have the largest percentage of agricultural loans, and expect that percentage to remain the same in the future. The lenders in Class I banks generally feel their agricultural loans are low risk, low to moderately profitable loans. Class II banks have slightly less than half of their loans as agricultural loans. They expect increased energy lending to decrease their agricultural lending. The Class II bank lenders feel their agricultural loans are low in risk and moderately profitable. The Class III banks have the lowest percentage of agricultural loans and expect them to remain the same or

TABLE XII  
LENDER VIEWS OF AGRICULTURAL LENDING

Perception of	Size of Banks						All Banks % of All Banks	
	Class I		Class II		Class III			
	Number	% of Class I	Number	% of Class II	Number	% of Class III	Number	% of All Banks
Risk in Agricultural Lending								
1. High	3	27	1	8	2	25	6	19
2. Moderate	1	9	3	23	3	38	7	22
3. Low	7	64	9	69	3	38	19	59
Profitability of Agricultural Lending								
1. High	0	0	2	15	1	13	3	9
2. Moderate	5	45	9	69	2	25	14	44
3. Low	6	55	2	15	5	63	15	47
Future of Agricultural Lending								
1. Increase	2	18	2	15	1	13	5	16
2. Remain the same	8	73	4	31	4	50	16	50
3. Decrease	1	9	7	54	3	38	11	34

decrease in the future. Their loans are considered moderately risky and low in profit.

### Case Study Results

#### Cattle Loans

The results of the written survey are based on responses from 19 lenders. Table XIII summarizes the financial characteristics of the six cases and the average cattle loans granted based only on the accepted loans. Any loans refused were treated as missing values in calculating averages. However, numbers making the loan are given.

One difficulty was encountered in examining the interest rate margin due to interpretational differences in the term "prime rate". The difference between actual loan interest rates and the U.S. prime rate was desired to eliminate variations in loan rates due to changes in the prime rate across the survey period. Most lenders reported their bank's prime rate, based on their cost of money. The average bank prime rate was 17.4 percent and the range for these values was from a low of 15.5 percent to a high of 19 percent. The term "interest rate" will therefore be defined as the margin above (or below) the bank prime rate.

Lenders granted an average of \$265,897 for Case A, or 91 percent of the loan requested. The average interest rate charged for a loan in Case A was 0.41 percent. Case A represented a strong financial situation, with a high current ratio and low leverage ratio. Among all cases, Case A received the largest average loan and lowest average interest rate. The typical collateral required included the purchased cattle, stored crops and feed.

TABLE XIII  
CASE STUDY CHARACTERISTICS AND RESULTS OF CATTLE LOANS  
BASED ON LOAN ACCEPTANCES

Characteristics	Case A	Case B	Case C	Case D	Case E	Case F
Current Ratio (Times)	1.58	1.36	0.65	0.50	0.75	1.36
Leverage Ratio (Times)	1.10	1.40	1.91	1.94	1.91	1.40
Addition to Retained Earnings, 1981	\$ 6,271	\$ 6,271	\$ 220	\$-16,939	\$ 199	\$ 6,271
Projected Addition to Retained Earnings, 1982	\$ 16,397	\$ 12,933	\$ 8,200	\$ 7,469	\$ 13,510	\$ 12,933
Cattle Experience (Yes or No)	Yes	Yes	Yes	Yes	No	Yes
Loan						
Cattle Loan Requested	\$291,825	\$291,825	\$291,825	\$291,825	\$291,825	\$291,825
Average Cattle Loan Granted	\$265,897	\$257,991	\$217,436	\$204,136	\$166,549	\$263,076
Number of Loans Granted	19	19	17	13	11	19
Percent of Cattle Loan Granted	91%	88%	75%	70%	57%	90%
Average Interest Rate on Cattle Loan <sup>1</sup>	0.41	0.42%	0.42%	0.61%	0.53%	0.49%

<sup>1</sup>Interest rate is defined as the margin above (or below) the bank prime rate charged.

Case B contained a lower current ratio and higher leverage ratio than Case A. It also included a capital loan request. Lenders granted an average of 88 percent of the cattle loan requested. The average interest rate and collateral requirements are approximately the same as Case A. The average interest rate for the capital loan was 0.42 percent above prime and the collateral required was the combine.

Case C reflected a farm experiencing a highly leveraged situation coupled with a poor current ratio. The average loan requested in Case C was 75 percent of the requested loan, with the same interest rate charged as Cases A and B. Many lenders requested additional collateral in Case C, including blanket liens on all crops, livestock, machinery and equipment.

The situation in Case D was similar to Case C except that the farm in Case D experienced a loss of income in the previous year. The average loan granted in Case D was 70 percent of the requested loan. As shown in Table XIII only 13 lenders agreed to loan some amount in Case D and those that did accept the loan charged a higher average interest rate. The collateral requirements were the same as Case C.

Case E was identical to Case C except that the farmer was assumed to have no experience with cattle in Case E. Only 11 lenders agreed to make a loan, and the average loan was 57 percent of the requested amount. The average interest rate charged was 0.53 percent for Case E. This rate is greater than the 0.42 percent interest rate of Case C, but less than the 0.61 percent charged for Case D. Thus, lenders appear to impose the highest interest rates on farmers who have had recent negative incomes.

The final case, Case F, was identical to Case B with the exception of a land loan request which was included in Case F. The average cattle loan granted in Case F was 90 percent of the requested loan, which is approximately the same as granted in Case B. The interest rate charged in Case F was 0.49 percent, while Case B was charged only 0.42 percent.

In analyzing the survey results, a problem was encountered concerning the treatment of loans not accepted by lenders. The preceding analysis treated rejected loans as missing values by assuming the action of rejecting the loan placed these responses in a different category than the accepted loan amounts. The alternative view assumes all responses should be treated alike, and loans not accepted should be counted as zero loan amounts.

A comparison of the average loans granted based on the treatment of missing values is shown in Table XIV. The average loans based on all responses are equal to or less than the average loans based only on accepted loans in every case. The values shown in the column labeled "n" are the number of responses used in the individual cases. The lowest amount granted for the loan requested are shown in the "minimum value" column. The loan requests for Cases C, D and E were refused by two, six and eight lenders, respectively. The standard deviations of the responses based on all responses are equal to or greater than those based only on accepted loans, as expected. To examine the implications of the two analyses of the average loans granted, several comparisons were made among cases using F-tests (39).

TABLE XIV  
COMPARISON OF AVERAGE LOANS  
GRANTED IN CASE STUDIES

Results Based On	n	Mean	Minimum Value	Standard Deviation
All Responses				
Case A	19	265,897	186,891	36,966
Case B	19	257,991	181,748	42,328
Case C	19	194,545	0	98,444
Case D	19	139,672	0	112,090
Case E	19	82,600	0	108,229
Accepted Loans				
Case A	19	265,897	186,891	36,966
Case B	19	257,991	181,748	42,328
Case C	17	217,432	85,180	74,934
Case D	13	204,136	103,219	67,751
Case E	11	142,672	29,182	107,966
Case F	19	263,076	186,891	36,922



The F-test values are shown in Table XV, and were obtained using a SAS program (39). The first comparison, A versus B, was used to test:

$$H_0: \bar{X}_A - \bar{X}_B = 0 \quad (16)$$

$$H_A: \bar{X}_A - \bar{X}_B \neq 0 \quad (17)$$

where  $\bar{X}_A$  and  $\bar{X}_B$  are the average loans granted in Cases A and B. This test was used to determine whether the Case A average loan is significantly different than the Case B average loan due to the capital loan request which accompanied Case B. The F-value calculated for this test using all responses was 0.0926, and using only accepted loan amounts was 0.1593. The probabilities of observing F-values larger than these are 0.7615 and 0.6907. Since neither probability is less than the chosen critical value of 0.05, the null hypothesis is not rejected. Thus, a cattle loan request appears to be unaffected by a simultaneous capital loan request.

Comparing A versus C tests  $H_0: \bar{X}_A - \bar{X}_C = 0$  against  $H_A: \bar{X}_A - \bar{X}_C \neq 0$ , where  $\bar{X}_C$  is the average loan granted for Case C. The objective of this test was to determine if the Case A loan differed significantly from the Case C loan amount due to the low current, high leverage position of Case C. The probabilities of observing F-values greater than those calculated in this comparison are 0.0071 and 0.0195. Both of these probabilities are less than the critical value and the null hypothesis was rejected. Therefore, highly leveraged farms with low current ratios

TABLE XV  
SIGNIFICANCE OF DIFFERENCES IN MEANS AMONG  
CASES BASED ON ALL RESPONSES AND  
ACCEPTED LOANS ONLY

Case Comparison	All Responses Basis		Accepted Loans Basis	
	F-Value	Prob. F	F-Value	Prob. F
A versus B	0.0926	0.7615	0.1593	0.6907
A versus C	7.5388	0.0071	5.6539	0.0195
C versus D	4.4596	0.0370	0.3496	0.5558
C versus E	18.5594	0.0001	10.0169	0.0021
B versus F	0.0383	0.8452	0.0659	0.7980

appear to face lower loan limits for cattle loans than farms less leveraged and in a better current position.

The third comparison, C versus D, tests  $H_0: \bar{X}_C - \bar{X}_D = 0$  against  $H_A: \bar{X}_C - \bar{X}_D \neq 0$ , where  $\bar{X}_D$  is the average loan granted for Case D. This comparison tested whether the loan granted for Case C was significantly different than the loan granted for Case D due to the loss of income in Case D. The probability of observing an F-value greater than the value calculated based on all responses is 0.037. This value is less than the critical value of 0.05, and the null hypothesis is rejected. However, if only the accepted loans are examined, the probability of observing an F-value greater than the calculated value is 0.5558. This value is greater than the critical value and is not sufficient to reject the null hypothesis.

This contradiction was resolved by examination of previous studies which found lenders to be responsive to the occurrence of a loss of income (11). These results agreed with the results obtained in comparing Cases C and D using all responses and the null hypothesis was rejected. This indicates that lenders impose lower cattle loan limits on farms which have had a recent loss of income.

Cases C and E were compared to test  $H_0: \bar{X}_C - \bar{X}_E = 0$  against  $H_A: \bar{X}_C - \bar{X}_E \neq 0$ , where  $\bar{X}_E$  is the average loan granted for Case E.

This test was done to examine the affect the lack of cattle experience in Case E had on the average loan granted. The values reported in Table XV for the probability of observing an F-value greater than that calculated are both less than .05, and the null hypothesis is rejected. A lack of experience in cattle may decrease the percentage of the cattle loan granted by the lender.

The final comparison involved Case B versus Case F and tested  $H_0: \bar{X}_B - \bar{X}_F = 0$  against  $H_A: \bar{X}_B - \bar{X}_F \neq 0$ , where  $\bar{X}_F$  is the average loan granted for Case F. This test was used to determine whether the loan amount granted for Case B differed significantly from the loan amount granted for Case F due to the land loan request in Case F. The probabilities of greater F-values occurring shown in Table XV are both greater than 0.05, and the null hypothesis is not rejected. This shows that a land loan request accompanying a cattle loan request likely has no affect on the cattle loan granted.

The statistical tests carried out in the preceding discussion yielded the same results using both all responses and accepted loans only in four out of the five comparisons made. The single contradictory comparison was resolved on the basis of previous studies. Since the results were the same 80 percent of the time, the remainder of the analysis concerning average loan amounts will include all responses.

Baker and Sonka (7) and Jones (27) have shown that lender characteristics are important in explaining loan acceptance. The loans granted for this study were classified according to the deposits of the

bank, the agricultural background of the lender and the educational background of the lender. The average cattle loans granted based on the sizes of banks are shown in Table XVI.

The banks are categorized in Table XVI using the same ranges of deposits shown in Table XI. The Class II banks made the largest average cattle loans in four out of the six cases. This agrees with the results of Table XI which showed Class II banks financed the largest proportion, 86 percent, of cattle loans requested. The means calculated for Class II lenders also had the smallest standard errors in four out of the six cases. The standard error is a measure of the amount of error in the sample mean which describes the population mean (40). Of the banks examined in this study, the Class II banks seem to make the largest cattle loans on the average. These averages generally had the smallest standard deviations.

The next lender characteristic examined was agricultural background (Table XVII). In every case, the lenders with an agricultural background loaned less than the lenders without an agricultural background. The standard errors of the means are also smaller in every case for lenders with an agricultural background.

This is a surprising finding, since it is generally assumed that a loan officer with an agricultural background is more familiar with farming practices, and thus more responsive to farm financial needs. However, the lending officers with agricultural backgrounds should also be more familiar with farming risks, which enables them to more

TABLE XVI  
SURVEY RESULTS CLASSIFIED ACCORDING TO  
BANK DEPOSITS<sup>1</sup>

Variable	N	Mean	Standard Deviation	Minimum Value	Std. Error of Mean
CLASS I					
Case A	6	241056	44271	186891	18074
Case B	6	229700	39351	186891	16065
Case C	6	194218	78938	85180	32226
Case D	6	154195	88645	0	36189
Case E	6	117808	108711	0	44381
Case F	6	232124	36744	186891	15001
CLASS II					
Case A	8	286120	12947	255000	4578
Case B	8	275861	38525	181748	13621
Case C	8	215514	79570	96600	28132
Case D	8	154063	118378	0	41853
Case E	8	103532	126031	0	44559
Case F	8	286120	12947	255000	4578
CLASS III					
Case A	5	263347	40673	204276	18190
Case B	5	263347	40673	204276	18190
Case C	5	161385	149958	0	67063
Case D	5	99220	138344	0	62317
Case E	5	6858	15336	0	6858
Case F	5	263347	40673	204276	18190

- <sup>1</sup>The classes are defined as:
- a. Class I, deposits under 24 million dollars;
  - b. Class II, deposits over 25 and less than 99 million dollars,  
and
  - c. Class III, deposits over 99 million dollars.

TABLE XVII  
 SURVEY RESULTS CLASSIFIED ACCORDING TO THE  
 AGRICULTURAL BACKGROUND OF  
 THE LENDERS<sup>1</sup>

Variable	N	Mean	Standard Deviation	Minimum Value	Std. Error of Mean
AGBACK = 0					
Case A	5	274315	39153	204277	17510
Case B	5	260688	45967	189686	20557
Case C	5	222264	77163	114293	34508
Case D	5	163899	113299	0	50669
Case E	5	102413	100395	0	44898
Case F	5	263606	40467	204277	18097
AGBACK = 1					
Case A	14	262890	37194	186891	9941
Case B	14	257028	42741	181748	11423
Case C	14	184645	105762	0	28266
Case D	14	131020	114632	0	30637
Case E	14	75524	113634	0	9941

<sup>1</sup>AGBACK = 0 represents lenders with no agricultural background and  
 AGBACK = 1 represents lenders with an agricultural background.

"correctly" identify the risk situations shown in the cases. Hence, smaller average loans with smaller standard errors were associated with lending officers having an agricultural background.

The final lender characteristic examined was the educational background of the loan officers. Table XVIII classifies the lenders based on their college education. The small amount of lenders not possessing college degrees somewhat hampers the analysis, but it is evident that lenders with a degree loaned smaller amounts than those without a degree, on the average. Also, the minimum values are much smaller for lenders with degrees than for lenders without degrees in five out of the six cases. The lenders with degrees appear much more reluctant to make the large cattle loans requested.

This analysis of lender characteristics was not meant to imply that a lender with a particular characteristic was any more or less qualified as a loan officer than a lender without that characteristic. The intent was merely to examine any traits or trends associated with cattle loans. Future research is needed to investigate lender characteristics using sample sizes large enough to apply statistical tests to the data.

#### Capital and Land Loans

The results of the capital and land loan requests are presented in Table XIX. Rejected loans were included in the calculations and assumed to have values of zero. The capital loan of \$61,650 was



TABLE XVIII  
 SURVEY RESULTS CLASSIFIED ACCORDING TO THE  
 EDUCATIONAL BACKGROUND OF  
 THE LENDERS<sup>1</sup>

Variable	N	Mean	Standard Deviation	Minimum Value	Std. Error of Mean
EDBACK = 0					
Case A	4	280881	21888	248050	10944
Case B	4	267495	28376	238280	14188
Case C	4	253785	25836	236986	12918
Case D	4	227155	21883	194355	10941
Case E	4	190026	129614	0	64807
Case F	4	267483	28387	238280	14194
EDBACK = 1					
Case A	15	261901	39661	186891	10240
Case B	15	255457	45807	181748	11827
Case C	15	178747	105105	0	27138
Case D	15	116343	115246	0	29756
Case E	15	53953	85346	0	22036
Case F	15	261901	39661	186891	10240

<sup>1</sup>EDBACK = 0 represents lenders with no college degree, and  
 EDBACK = 1 represents a lender with a college degree.

TABLE XIX  
RESULTS OF CAPITAL AND LAND LOAN REQUESTS

	Capital Loan	Land Loan
Loan Requested	\$61,650	294,000
Average Loan Granted	\$42,055	52,611
Percent of Loan Granted	68%	18%
Average Interest Rate <sup>1</sup>	0.41%	0%
Number of Lenders which Accepted Loan	15	5

<sup>1</sup>The interest rate is defined as the amount charged above the bank prime rate.

requested in Case B to purchase a 24-foot grain combine, and the \$294,000 land loan was requested in Case F to purchase 420 acres of cropland.

The average capital loan granted was \$42,055, or 68 percent of the amount required. The average interest rate charged was 0.41 percent above the prime rate. The typical collateral requirements were the purchased combine and all other unencumbered machinery. The terms and maturities of the loans granted varied from one-year renewable loans to five-year loans with floating interest rates. The capital loans granted were far more diversified than the cattle loans granted, with smaller average amounts of capital loans granted.

These results are consistent with those reported by Barry, Baker and Sanint (11) who also showed that agricultural lenders express different credit responses for operating (for this study, cattle) versus capital loans. They found the average capital loan granted for farms experiencing a positive gain in income (such as Case B in this study) was in the range of 66 to 69 percent. The average capital loan granted in this study of 68 percent reinforces the results found by Baker and Sonka (7).

The average loan loan granted was \$52,611 or 18 percent of the amount requested. However, only five lenders agreed to make a land loan, and all of these were for interim financing only. Two banks agreed to finance a down payment on the land until financing through

other sources could be arranged. The remaining three banks agreed to finance the entire loan amount for a maximum of 90 days. Long term financing was not available from any of the banks.

## CHAPTER V

### MANAGEMENT APPLICATIONS

This chapter presents the credit relationships implied by the survey results and the resulting credit row coefficients. The results of the lender survey are incorporated into the L.P. model of the farm to more accurately reflect lender actions. The revised L.P. model is used to derive a liquidity value curve for the North Central Farm. Finally, several farm management applications are explored using the L.P. model.

#### Credit Row Coefficient Modifications

Equation (14), Chapter III, which was used to define the coefficients of the credit row, assumed that lenders did not differentiate among the inputs or production activities in making loans. The survey used in this study found that lenders financed an average of 83 percent of the cost of stocker cattle, and required the farmer to supply all other inputs used in stocker production. This contradicts an earlier assumption that lenders would finance a constant percentage of all the inputs, including the cattle, used in stocker production. To reconcile this difference, a new relationship was introduced as

$$C_1 = P_1 + \bar{P}_1 \quad (18)$$

where  $C_1$  is the total operating cost of producing stocker steers,  $P_1$  is

the purchase cost of the cattle, and  $\bar{P}_1$  is the cost of all other stocker inputs.

Lenders were found to lend an average of 76 percent of the cost of the inputs required to produce a crop, while they generally did not take into account the expected sale value of this crop. Thus, for crops

$$C_2 = P_2 \quad (19)$$

where  $C_2$  is the total operating cost of producing the crops, and  $P_2$  is the cost of the inputs which lenders will finance.

Equations (18) and (19) were used to modify equation (14), which yielded

$$D + C_1 + C_2 \leq .65A + .83P_1 + .76P_2 \quad (20)$$

This equation shows that the existing debt of the farm (D) plus the costs of producing stocker steers ( $C_1$ ) and crops ( $C_2$ ) must be less than or equal to 65 percent of the farm's assets (A) plus 83 percent of the purchase price of the steers ( $P_1$ ) and 76 percent of the cost of crop inputs ( $P_2$ ). Equation (20) may be restated as

$$D + P_1 + \bar{P}_1 + P_2 \leq .65A + .83P_1 + 76P_2 \quad (21)$$

Combining terms results in

$$(.17P_1 + \bar{P}_1) + .24P_2 \leq .65A - D.$$

Equation (22) defines the new credit row coefficients for the L.P. model. It shows the coefficients for livestock to be 17 percent of the cost of the cattle plus 100 percent of the cost of the remaining livestock inputs. The new credit row coefficients are presented in Table XX for the livestock activities. The coefficients ( $a_n$ ) are all smaller than those calculated earlier in Table VII with the exception of the cow-calf (B001LV11) coefficient. The banks loaned a greater percentage on the cattle than anticipated. The cow-calf coefficient is larger due to the

TABLE XX  
CREDIT ROW COEFFICIENTS BASED ON LENDER SURVEY  
RESULTS FOR LIVESTOCK ACTIVITIES

Item	B001LV11	B002LV13	B003LV13	B004LV13	B005LV13
Salt and Min.	2.69	1.63	1.13	1.13	1.63
Protein Suppl.	47.35	7.00	7.00	6.30	7.00
Starter Feed		4.80	4.80	4.80	4.80
Vet. and Med.	4.48	6.00	4.00	5.00	4.00
Mach. and Eqpt.	<u>12.76</u>	<u>3.29</u>	<u>2.41</u>	<u>2.41</u>	<u>3.29</u>
Input Cost ( $\bar{P}_1$ )	67.28	22.72	19.34	19.64	20.72
Steer Calf		221.27	402.30	321.84	321.84
Scale Factor		<u>.17</u>	<u>.17</u>	<u>.17</u>	<u>.17</u>
Steer Equity ( $P_1$ )		<u>37.62</u>	<u>68.39</u>	<u>54.71</u>	<u>54.71</u>
$.17P_1 + \bar{P}_1$ ( $a_n$ ) <sup>1</sup>	67.28	60.34	87.73	74.35	75.43

Source: Department of Agricultural Economics (16)

<sup>1</sup> $a_n$  represent the rates at which production activities absorb credit, and are used in the credit row of the model.

inclusion of 100 percent of the input costs. The new coefficients for stocker activities also have a smaller range than those previously calculated. The range in Table XIX is from \$60.34 to \$87.73, while the  $a_n$  coefficients in Table VII ranged from \$85.39 to \$147.57.

The credit row coefficients for crops obtained using equation (22) are shown in Table XXI. These  $a_n$  coefficients are smaller than those calculated in Table VIII and also have a smaller range. Lenders exclude consideration of the sale values of the crops in financing crop production.

#### L.P. Model Solution

The coefficients from Tables XX and XXI were put in the credit row of the L.P. model and a new solution was obtained. Table XXII compares the modified solution with the base solution from Chapter III. The solutions are the same with the exception of the amount of credit reserved. For the base solution all credit available to the farm was used. The new solution, using the smaller credit row coefficients, allocates \$54,239 to the credit reserve. Thus, the case farm with the same balance sheet situation and production organization has a fairly large credit reserve.

The impact of changes in the credit row and reserve was examined through the RANGE output. The lower limit of credit was found to be \$78,761, which shows that unless the credit available to the farm drops below this value, no change in the solution occurs. The lower limit of \$78,761 plus the credit reserve of \$54,239 equals the total credit of \$133,000 available to the farm. Thus, the credit in use is \$78,761.



TABLE XXI  
CREDIT ROW COEFFICIENTS BASED ON LENDER  
SURVEY RESULTS FOR CROP ACTIVITIES

Item	B0060273	B0140373	B0070276	B0080376	B0090281	B0100381	B0120289	B0130389
Seed	3.75	3.75	5.00	5.00	5.60	5.60	5.00	5.00
Fertilizer	13.50	13.50	13.50	13.50	33.20	33.20	13.50	13.50
Nitrogen	8.37	8.37	10.00	10.00			10.00	10.00
Insecticide	1.25	1.25	4.50	4.50	18.00	18.00		
Bailing Wire					12.00	9.00		
Fert. Spreader	2.25	2.25	4.50	4.50	2.70	2.70	4.50	4.50
Mach. and Eqpt.	12.71	12.71	13.60	13.60	30.80	23.93	10.49	10.49
Total (P <sub>2</sub> )	41.83	41.83	51.10	51.10	102.30	92.43	43.39	43.49
Scale Factor	.24	.24	.24	.24	.24	.24	.24	.24
Coefficient (a <sub>n</sub> )	10.04	10.04	12.26	12.26	24.55	22.18	10.44	10.44

Source: Department of Agricultural Economics (16)

TABLE XXII  
MODIFIED SOLUTION OF LINEAR  
PROGRAMMING MODEL

Name	Activity	Base Solution	Modified Base Solution
B001LV11	Cow-Calf	20.0 Head	20.0
B005LV13	Stocker Steers	851.5 Head	852.7
B0060273	Grain Sorghum	160.0 Acres	160.0
B0070276	Wheat	29.7 Acres	29.7
B0080376	Wheat	420.0 Acres	420.0
B0090281	Alfalfa Hay	120.0 Acres	120.0
B0010185	Native Pasture	260.0 Acres	260.0
B0120289	Grazeout	290.3 Acres	290.3
LHIRE100	Hire Labor 1	1,760.0 Hours	1,760.0
LHIRE200	Hire Labor 2	2,509.1 Hours	2,513.6
CAP1BOR1	Borrow Ann. Capital	157,756.5 Dollars	169,603.2
CREDRES1	Reserve Credit	0.0 Dollars	54,239.1
AUMRENT1	Rent Wheat Past.	811.3 AUM	813.2
AUMRENT2	Rent Wheat Past.	552.3 AUM	553.7
AUMRENT3	Rent Wheat Past.	118.2 AUM	118.6
RENTNAT5	Rent Native Past.	341.3 AUM	341.9
HAYTRAN1	Feed Own Hay	131.3 Tons	131.5
OBJ1	Objective Function	101,622.9 Dollars	100,797.0

The price range of CREDRES1 (the activity which reserves credit) was found to be from zero to \$1.43406. Within this price range, the mix of activities in the solution will not change. Should the value of credit in reserve rise to \$0.43406 the amount of credit in reserve would rise to \$73,025, reducing the credit used in production activities.

#### Liquidity Cost Curve

A liquidity cost curve was estimated for the case farm by parametric variation of the value of credit in reserve. The procedure implies a shifting liquidity value curve, while the liquidity cost function was constant due to production and prices being given. According to Barry and Baker (9):

. . . The model solutions at varying credit reservation prices reflect equilibrium points between a constant liquidity cost function and a shifting liquidity value function. In the process the liquidity cost curve for the planning horizon is traced out with linear segments because the linear programming technique was used (p. 224).

The liquidity cost function is the marginal value product curve of credit used for loans. This curve declines at an accelerating rate due to the law of diminishing marginal returns. As additional units of credit are committed to use, the returns from the resources acquired with the borrowed funds decline at increasing rates (10).

A summary of the reservation prices and resulting solutions found using the parametric procedure is shown in Table XXIII. For this analysis, the right hand side of the credit row was assumed to be \$78,761, the amount of credit used, and the objective function value of CREDRES1 was \$0.01. This change implies an increase in the farm's debt by \$54,239. In this manner, every solution involved competition among credit in use and reserve.

TABLE XXIII

SUMMARY OF SOLUTIONS OBTAINED USING VARYING  
CREDIT RESERVATION PRICES

Reservation Price (\$) <sup>1</sup>	Credit Reserve (\$)	Percent in Reserve <sup>2</sup>	Steers (Head)	Solution		Objective Function <sup>3</sup>	Returns <sup>4</sup> (\$)	Borrowed Capital (\$)
				Cropland Planted (Acres)				
0.01	0.0	0.0	852	730		100,225	100,255	169,603
0.43	18,967.3	24	601	730		100,443	92,210	126,575
0.45	27,119.6	34	493	730		100,610	88,352	108,081
0.55	31,450.7	40	435	730		103,477	85,974	98,256
0.58	36,004.6	46	375	730		104,123	83,398	87,925
0.92	38,825.4	49	337	730		116,371	80,845	81,526
1.00	47,673.3	60	0	700		118,937	71,264	24,371

<sup>1</sup>The reservation price is the value the farm manager places on credit in reserve.

<sup>2</sup>The percent of total credit available to the farm which was kept in the credit reserve.

<sup>3</sup>The objective function value being maximized, including the value of credit in reserve.

<sup>4</sup>Returns = Objective Function - (Reservation Price X Credit Reserve).

The reservation price was varied from \$0.01 to \$1.00, and the points at which the solution changed are identified in Table XXIII. The values in the Percent in Reserve column show the percentage of credit held in reserve. The steers values are the number of stocker steers in each solution, and the Cropland Planted values are the total acres of wheat, grain sorghum, and alfalfa in the solutions. It is evident that the stocker steers are much more sensitive to changes in the value of credit in reserve. The steers varied from 852 head at a reservation price of \$0.01 to 0 head at a price of \$1.00, while the crops remained constant at 730 acres for all prices until \$1.00 was reached.

This behavior may be an explanation of the recent declining loan demand for stocker steers. High inflation and unstable government actions have led to increased uncertainty. This increased uncertainty causes farmers to place higher liquidity value on credit in reserve, which reduces the number of stocker steers demanded. This results in the reduced demand for stocker loans which lenders are experiencing, according to the lender survey of this study.

The Objective Function values in Table XXIII increase at each solution, while the Returns to the farm above operating costs decrease. Returns were found by using the equation

$$\text{Returns} = \text{Objective Function} - (\text{Reservation Price} \times \text{Credit Reserve}). \quad (23)$$

The credit reserve yields a positive objective value, but since it is nonmonetary it is not included in Returns. Borrowed Capital values are the amounts of borrowed annual capital necessary for each solution. The annual capital borrowed declines as the reservation price rises.

The data from Table XXIII was used to plot the firm's liquidity cost curve, CC, shown in Figure 9. The points labelled  $L_i$  are identified to represent the intersections of the shifting liquidity value curves at various credit reservation prices. These points represent equilibrium allocations of credit in use and reserve. The horizontal axis measure, (a) the percentage of credit in use from left to right, and (b) the percentage of credit in reserve from right to left. The total amount of credit to be allocated among use and reserve is 100 percent.

The liquidity cost curve is shown in Figure 9 as declining at an accelerating rate due to the law of diminishing marginal returns. As credit is successfully committed to use, returns from the use of loan proceeds decrease at an increasing rate. At low credit reservation prices an increase in the value of credit in reserve results in a large increase in credit reserved. At high credit reservation prices an increase in the value of credit in reserve results in a small increase in the credit reserve.

The liquidity cost curve shows that farmers who value credit in reserve at less than \$0.42 may be approaching a critical point of having no credit in reserve. This might be typical of a farmer who, facing tight cash flows due to high operating costs, fails to reduce his number of stockers produced. As the purchase cost of stockers rises the amount of credit required to produce a given number of stockers increases. Thus, the credit reserve is reduced, placing the farmer in a less liquid position. However, since the credit relationship requires the farmer to provide 17 percent equity in the cattle, a credit reserve of zero does not leave the farmer with absolutely no credit available, improving his position somewhat.

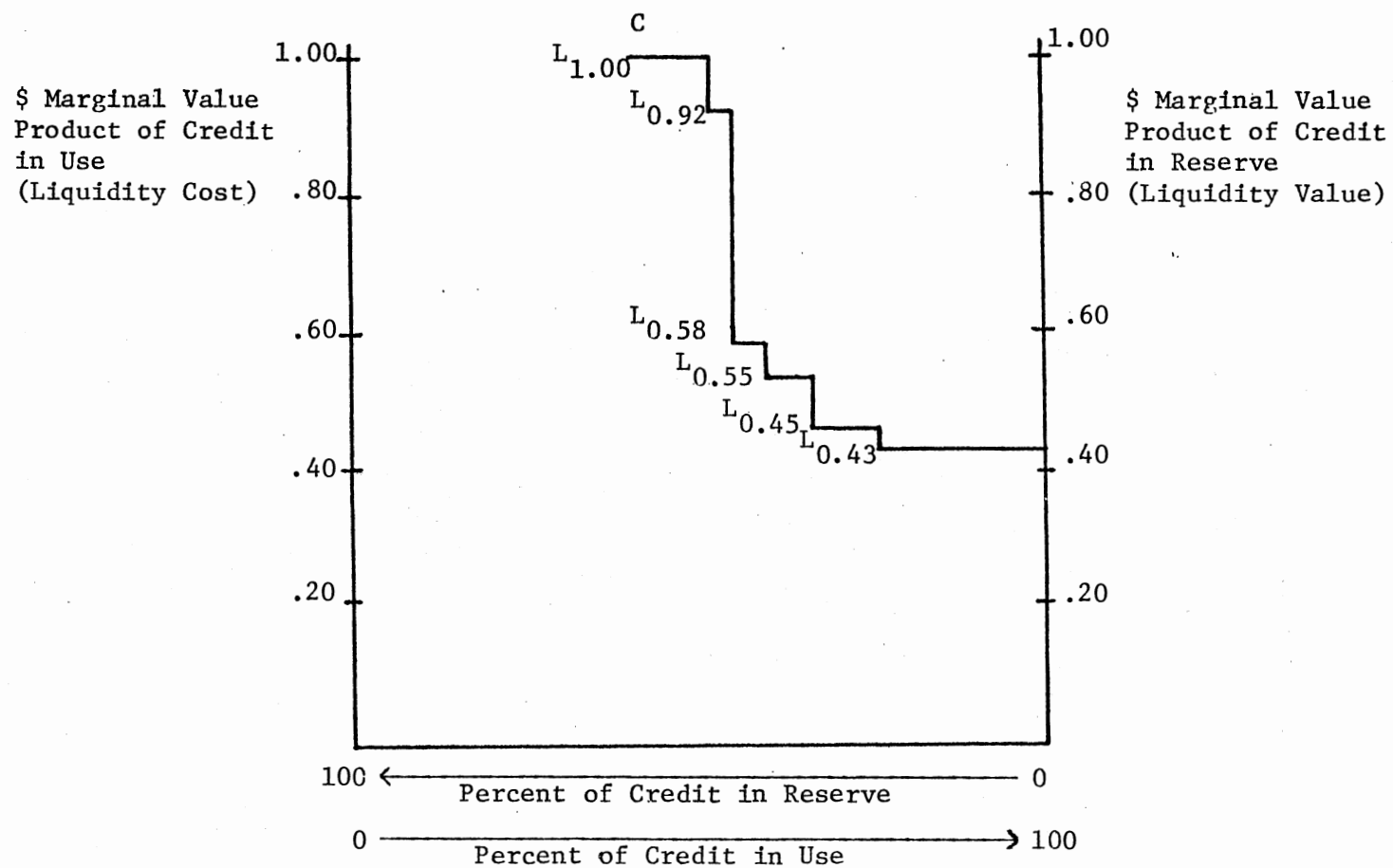


Figure 9. Liquidity Cost Curve

In summary, the results of the lender survey required new values of credit row coefficients for production activities. The new coefficients were smaller in every case than those calculated in Chapter IV. A solution was obtained with the new coefficients, and was found to be approximately the same as the base solution. The only difference which occurred was an increase in the credit in reserve from zero in the base solution to \$54,239 in the new solution. A series of solutions was then used to trace out the liquidity cost curve for the farm, in linear segments. The curve showed the farm was insensitive to values of credit in reserve less than \$0.44.

#### Farm Management Applications

Various management situations faced by stocker operations can be examined using the base model with the credit coefficients obtained in the survey. In the following analysis, the amount of credit available in the credit row will be \$133,000, and the reservation price for credit in reserve will be \$0.01 for all situations examined. The alternative situations examined include exclusion of rented wheat pasture, exclusion of grazeout small grain pasture, and various wheat and stocker prices.

#### Optimal Solution Without Rented Wheat Pasture

Rented wheat pasture provided a large portion of the grazing necessary for stocker production in the base solution. Wheat pasture may not always be available for rent, however, because of poor weather, higher rent bids by other farmers, or changes in land use. To examine the consequences of not renting wheat pasture, a solution was obtained



using only the land controlled by the case farm. This solution is shown in Table XXIV.

The crop acreage is unchanged, so the adjustment to the no rented wheat pasture situation is entirely in the number and type of stocker cattle produced. The number of stocker steers decreased from 852 in the base solution to 301 in the new solution. The stocker type changed from heavy to lightweight cattle grazed until May 15, as in the base solution. The lighter cattle entered the solution because they have lower grazing requirements than the heavy cattle.

The labor and capital requirements are much smaller for the new solution due to the large decrease in stocker numbers. The credit reserve increased to \$100,370, leaving \$32,630 of credit in use. The RANGE output for the new solution showed that the credit reservation price would have to rise to \$0.61 before the solution would change. At this price, the heavier steers produced in the base solution would enter the new solution, replacing the lightweight cattle. The objective function value for the new solution of \$68,162 is much lower than the base solution value of \$100,797. Thus, stocker steers on rented wheat pasture can provide a significant return to the farm.

To summarize, the loss of rented wheat pasture should cause lighter stocker cattle to be produced in fewer numbers, while crop acreage remains constant. The credit reserve becomes larger, and the shadow price of credit in reserve increases. Returns to the farm are drastically reduced, along with labor and capital requirements.

#### November to March Steers Only

Another situation which may be faced by stocker operations concerns

TABLE XXIV  
OPTIMAL SOLUTION USING NO RENTED  
WHEAT PASTURE

Activity	Amount
B001LV11	20 Head
B002LV13	301 Head
B0060273	160 Acres
B0070276	30 Acres
B0080376	420 Acres
B0090281	120 Acres
B0110185	260 Acres
B0120289	290 Acres
LHIRE100	1,289 Hours
LHIRE200	945 Hours
CAP1BOR1	60,417 Dollars
CREDRES1	100,370 Dollars
HAYTRAN1	49 Tons
OBJ1	68,162 Dollars

the sale of steers in March instead of May. All prior solutions have chosen steers which grazeout wheat as the stocker enterprise. Poor wheat pasture, bleak price forecasts or cash flow obligations may force stockers to be sold in March. Also, some farmers may prefer not to grazeout their wheat. To analyze this situation, the two grazeout steer activities were deleted from the base model, and the new solution obtained is presented in Table XXV.

The cow-calf activity increased from 20 to 28 head for the non-grazeout solution. The stocker steers chosen were the lightest available, being bought at 400 pounds and sold at 553 pounds. The wheat acreage has increased by 94 acres over the amount in the base solution, and small grain grazeout decreased to zero. The number of stockers produced was 251, compared to 852 for the base solution.

The capital and hired labor requirements are also reduced due to the low number of stockers produced. The only pasture rented was 60 AUMs of native pasture in November. Credit in reserve was \$101,241, leaving \$31,759 in use. The credit in reserve was much greater for the new solution than the base solution, at the same credit reservation price of \$0.01. The RANGE output showed that the credit reservation price would have to rise to \$0.42 for a change of solution to occur. The objective function value of \$81,311 is \$19,486 less than the objective function value calculated in the base solution.

A decision not to graze steers until May has a major impact on the farm. Stocker numbers are greatly reduced, while cow-calf units are increased. Returns are decreased by almost \$20,000. The credit in use decreases, indicative of a conservative operator. Also, since the farm is faced with fewer alternatives there is no use for credit. The low

TABLE XXV

## OPTIMAL SOLUTION USING NO GRAZEOUT STEERS

Activity	Amount
B001LV11	28 Head
B004LV13	251 Head
B0060273	160 Acres
B0070276	320 Acres
B0080376	224 Acres
B0090281	120 Acres
B0110185	260 Acres
B0120289	0 Acres
LHIRE100	966 Hours
LHIRE200	561 Hours
CAP1BOR1	49,010 Dollars
CREDRES1	101,241 Dollars
RENTNAT5	60 AUM
HAYTRAN1	43 Ton
OBJ1	81,311 Dollars

credit requirement may be useful for producers who have become highly leveraged, and have thus reduced their credit reserve.

#### Alternative Wheat Prices

Farms producing wheat and livestock must make production decisions based on uncertain prices. To examine the impact alternative wheat prices have on the optimal farm solution, the price of wheat was varied parametrically. The resulting solutions are shown in Table XXVI for wheat prices of two, four, and six dollars per bushel. A wide price range was examined because the solution was insensitive to small price changes.

As the price of wheat increased the number of stockers decreased, but the same weights of stockers were used in all three solutions. Cows and grain sorghum remained the same at all three wheat prices. The acreage of wheat increased from 448 acres at a price of \$2.00 to 616 at a price of \$6.00. At the \$6.00 wheat price alfalfa hay was forced out of the solution and wheat came in. Small grain grazeout decreased from 292 acres to 244 acres due to the declining stocker numbers and increased wheat acreage. Hired labor and borrowed annual capital dropped as the price of wheat climbed, indicating that stockers required relatively more of both than wheat did. The credit reserve increased as stockers declined, reflecting the lower credit requirements of wheat. Rented pasture decreased in every period except AUMRENT2, when it increased for a wheat price of \$6.00. The increase was caused by the decreased grazeout acreage and increased wheat acreage, making it necessary to purchase wheat pasture. No hay was transferred from production to use for the \$6.00 wheat price solution since no hay was produced. The objective

TABLE XXVI  
OPTIMAL SOLUTIONS AT VARIOUS WHEAT PRICES

Activity	<u>Wheat Price</u>		
	\$2.00/Bu.	\$4.00/Bu.	\$6.00/Bu.
B001LV11	20 Head	20	20
B005LV13	854 Head	853	801
B0060273	160 Acres	160	160
B0070276	35 Acres	30	196
B0080376	413 Acres	420	420
B0090281	120 Acres	120	0
B0110185	260 Acres	260	260
B0120289	285 Acres	290	244
B0130389	7 Acres	0	0
LHIRE100	1,760 Hours	1,760	1,740
LHIRE200	2,520 Hours	2,514	2,072
CAP1BOR1	169,847 Dollars	169,603	163,880
CREDRES1	54,128 Dollars	54,239	59,557
AUMRENT1	816 AUM	813	641
AUMRENT2	553 AUM	553	563
AUMRENT3	119 AUM	119	124
RENTNAT5	343 AUM	342	340
HAYTRAN1	132 Tons	131	0
OBJ1	75,641 Dollars	100,182	161,957

function increased at every price increase, and more than doubled in the price range examined.

The strategies indicated by the solutions in Table XXVI followed the expected pattern. At low wheat prices, more stockers and less wheat should be produced, resulting in high labor, capital and credit requirements and low returns. As wheat prices rise, stockers should be decreased and wheat should be increased, requiring less labor, capital and credit and yielding higher returns. Land formerly used for other activities changes to wheat production, resulting in a more specialized farm.

#### Alternative Stocker Prices

Stocker prices are also a source of price uncertainty. Stockers may be purchased in November based on prices expected in March and/or May. To examine the affects various stocker prices have on the optimal farm organizations, the sale price of steers were set at \$65.00, \$75.00, and \$85.00 per hundredweight. Table XXVII reports the solutions obtained at these various prices.

At all prices, grazeout steers are the stocker activity chosen. Their numbers increased from 338 head at a price of \$65.00 per cwt. to 854 head at a price of \$85.00 per cwt. Cows remained constant at 20 head for all three prices. Crop acreage remained approximately the same for all solutions.

Labor and annual capital requirements increased as the number of steers produced increased. Borrowed annual capital more than doubled as steer prices rose from \$65.00 to \$85.00. Accompanying the capital increases were reductions in the credit reserve, which declined from

TABLE XXVII  
OPTIMAL SOLUTIONS AT VARIOUS STOCKER PRICES

Activity	<u>Sale Price of Steers</u>		
	\$65.00/cwt.	\$75.00/cwt.	\$85.00/cwt.
B001LV11	20 Head	20	20
B005LV13	338 Head	853	854
B0060273	160 Acres	160	160
B0070276	30 Acres	30	34
B0080376	420 Acres	420	413
B0090281	120 Acres	120	120
B0110185	260 Acres	260	260
B0120289	290 Acres	290	285
B0130389	0 Acres	0	7
LHIRE100	1,369 Hours	1,760	1,760
LHIRE200	1,000 Hours	2,514	2,519
CAP1BOR1	81,526 Dollars	169,630	169,847
CREDRES1	93,065 Dollars	54,240	54,128
AUMRENT1	0 AUM	813	816
AUMRENT2	0 AUM	554	554
AUMRENT3	0 AUM	119	119
RENTNAT5	95 AUM	342	343
HAYTRAN1	54 Tons	131	132
OBJ1	57,094 Dollars	96,006	153,260



\$93,605 to \$54,128. The rented wheat pasture and transferred hay increased as stocker prices increased because larger numbers of stockers were produced. Returns increased from \$57,094 to \$153,260.

The solutions for various stocker prices, like those for wheat prices, followed the expected pattern. The farm was fairly unresponsive to rises in price above \$75.00, as evidenced by the similarity of the two solutions at prices of \$75.00 and \$85.00. At low stocker prices fewer steers were produced, requiring relatively small amounts of labor and capital. The credit reserve was large, and returns low. As stocker prices increased production of May steers increased. As the number of stockers increased, labor and capital requirements also increased, while the credit reserve shrunk. Returns to the farm almost tripled as the stocker price rose from \$65.00 to \$85.00. Thus, at high stocker prices liquidity is given up in return for high returns.

#### Summary of Management Applications

The farm management situations examined included no rented wheat pasture, March steers only and various wheat and stocker prices. The elimination of rented wheat pasture caused lighter stocker cattle to be produced in fewer numbers, while crop acreage remained the same. Labor, capital and credit requirements for the farm are decreased, and returns are drastically reduced.

Production of March steers only resulted in greatly reduced stocker numbers. The cow herd was increased, along with the wheat acreage. Returns are less than those for the base solution, but greater than those for the solution using no rented wheat pasture. Labor, capital and credit requirements have again decreased, compared to the base solution.

The various wheat prices examined showed that at low wheat prices more stockers and less wheat was produced, resulting in high labor, capital and credit requirements and low returns. As wheat prices increased, wheat production increased and stocker production decreased. This resulted in a more specialized farm.

The various stocker prices examined revealed that the farm was insensitive to rises in stocker prices above \$75.00 per cwt. At low prices, fewer stocker were produced. This required small amounts of labor, capital and credit. As stocker prices rose production increased, causing labor, capital and credit requirements to increase. Crop acreage remained constant.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

Farmers are being forced to rely more on borrowed funds for their production activities. Increased borrowed funds decreases the farm's credit reserve. Since the credit reserve is a major source of financial liquidity, increased borrowing places the farm in a more risky position. The farm manager faces a conflict between production decisions and risk management decisions. The farmers' production decisions may be affected by his lender, who must manage his own financial risk exposure, and the farmer needs to account for lender strategies in farm planning.

Several studies have examined liquidity management for cash grain farms in Illinois. Oklahoma stocker operations represent large short term investments, requiring as much or more emphasis on liquidity management as cash grain farms. The North Central area of Oklahoma in particular is known for large wheat and stocker farms. However, lenders in the area have witnessed a decreased demand for stocker loans in the past two years. Probable causes are recent low spring cattle prices and high liquidity values placed on credit in reserve by farmers.

The objectives of this study were to identify North Central Oklahoma farmer and lender strategies, derive a liquidity cost curve for a benchmark farm, and evaluate the impacts of alternative organizational and price situations.

These objectives were accomplished by first imposing credit considerations into the production theory of the firm. A benchmark farm was constructed using linear programming and a credit equation was added with assumed coefficients. The validity of these coefficients was tested by surveying agricultural lenders, and the survey results were incorporated into the credit equation of the farm model. The liquidity cost curve for the farm was then traced out by using a parametric programming routine on the model. Finally, the impacts of changes in the model's activities and prices were examined.

#### Base Model Summary

North Central Oklahoma farm data were collected for use in specifying the activities and resources of the benchmark farm. Wheat is the predominant crop of the area, followed by grain sorghum and alfalfa hay. Livestock activities include cow-calf production and stocker steer grazing on wheat pasture. Budgets were then chosen to represent each of these activities.

Use of linear programming requires specification of the land, labor, capital and management resources of the case farm. A large farm of 1,280 acres was chosen to accentuate the importance of financial and production decisions. For example, a larger farm has larger credit requirements. Also, 40 percent of the farms in the area were found to have 500 acres or more. Available family labor and hired labor were specified. Short-term capital consisted of the cash on hand, and intermediate capital included the machinery and equipment complement required by the budgets. Long term capital was the value of owned land.

Management was assumed to be knowledgeable and capable enough to implement and carry out the optimal farm plan.

Input prices used in the model were drawn from the budgets used, as were crop prices. Crop prices represent current (1981-82) levels projected when the budgets were developed. Livestock buying and selling prices were calculated using steer calves for the base price projection. The price relationships between the base and all other cattle in the model were then used to project the monthly livestock buy and sell prices. The prices of labor were differentiated according to part-time or full-time employment.

The activities, resources and prices of the case farm were combined using a computer program called OKFARMS to form a linear programming model. OKFARMS generates a matrix, uses MPSX to solve the model, and then translates the solution into an easy to read report form. The OKFARMS program is thus especially useful for education and extension applications involving users with a limited knowledge of linear programming. The farm model was required to reflect the credit used and generated by production activities. A credit row was added to the generated matrix to provide a means of allocating credit to use or reserve. Also, an activity was added to reflect positive liquidity values of credit in reserve.

A base solution was then obtained for the North Central Oklahoma case farm which included 852 stocker grazeout steers, 20 cow-calf units, rented wheat pasture and 451 acres of wheat. The remainder of the land was used for grain sorghum, alfalfa hay, and pasture production. The base solution was then used to generate the financial statements which

accompanied each loan request in the lender survey. The base solution was assumed to be the projected farm plan for the case farm used in the study.

### Lender Survey Summary

A lender survey was developed to estimate lender behavior in regard to stocker steer loans. Several surveys have been used before in evaluating loans for cash grain farms, but this was the first investigation of stocker lending in Oklahoma. Thirty-two agricultural lenders were surveyed, primarily in the North Central area of Oklahoma.

The survey consisted of two parts. The first part was an interview conducted in person at the lender's institution. The topics covered included the lender's views on agricultural lending, expected changes in agricultural lending, and general stocker and crop lending practices. The second part of the survey was written, and was completed by the lender at his convenience. The written portion of the survey included six case situations based on the base solution of the case farm. The cases were designed to reflect various equity positions and income experiences for the case farm. Each case study included a balance sheet, income statement and cash flow statement as supporting financial information. The lenders were free to use any information from these statements in evaluating the loan requests.

An average of 42 percent of the banks' total net loans were agricultural loans. The smaller banks had the largest proportion of agricultural loans and the large banks had the smallest proportion. The banks were classified as Class I, II, or III according to their deposits. Deposits of the institutions ranged from seven million dollars to one

and one half billion dollars. Banks with deposits less than 25 million dollars were named Class I, those with 25 million to 99 million dollars were named Class II, and those with greater than 100 million dollars were named Class III.

The average stocker loan granted by all banks was 83 percent of the amount requested. Class II banks loaned the greatest amount, 87 percent, while Class III banks loaned the least, with 78 percent. The collateral required for the stocker loans consisted of the purchased cattle and occasionally machinery and equipment. Net worth statements were the primary financial statements examined in evaluating the customer. The need for financial statements increased as bank size increased. Stocking rates were determined by farmers, with bank officers preferring to avoid farm management decisions.

The average crop loan granted by all banks was 76 percent of the amount requested. Class I banks loaned an average of 86 percent of the crop loan requested, while Class III banks loaned an average of only 61 percent. Crop loans were included in operating lines of credit by most lenders. These loans were secured by machinery and equipment, livestock, and a lien on all growing crops. Only eight lenders accepted a lien on growing crops as the sole source of collateral.

Fifty-nine percent of all lenders felt agricultural lending was low risk. The profitability of agricultural lending was rated low by 47 percent of all lenders and moderate by 44 percent of all lenders. Fifty percent of all banks expect their agricultural lending to remain the same in the future, while 34 percent expect their agricultural lending to decline. More of the Class II banks expect declines in agricultural lending than Class I and III banks due to their increased energy lending.

The results of the case study portion of the survey indicated that lenders are unaffected by capital loan requests made at the same time as stocker loan requests. Lenders were found to be very responsive to their clients' current equity positions in granting stocker loans. A case farm with a high current ratio and low leverage ratio was granted an average of 91 percent of the stocker loan requested. However, the same case farm with a low current ratio and high leverage ratio received only 67 percent of the stocker loan requested.

Lenders were also found to be responsive to past income and cattle experience. Comparison of two case farms showed that the farm case with a positive income the preceding year received an average of 19 percent more of the requested loan than the farm case with a negative income. A farm manager with cattle experience received an average of 38 percent more of the requested stocker loan than a manager of the same farm with no cattle experience received. Both of these results are consistent with findings of previous studies.

Lenders were classified according to their agricultural and educational background to determine whether these characteristics influenced their lending behavior. The lenders with no agricultural background were more liberal in the amounts of loans granted for the case studies than lenders with agricultural backgrounds. This was thought to be due to variations in lenders' perceptions of the risk involved in the cases. Lenders with agricultural backgrounds would tend to be more aware of the production and marketing uncertainty faced by the farmer and lend smaller amounts based on this uncertainty. Lenders classified according to their education revealed that those with a college degree granted smaller stocker loans, on the average, than lenders not possessing a college degree.



The average capital loan for a combine granted by all lenders was 68 percent of the amount requested. All unencumbered machinery and the asset being purchased comprise the typical collateral required for the capital loan. The maturities and interest rates varied widely among banks, with one-year renewable loans and floating interest rates most prominent. The final loan request in the survey was a land loan request, which was accepted by only five lenders. All five agreed to provide interim financing until alternative long-term credit was arranged. Two lenders agreed to finance a down payment on the land, and three lenders carried the full balance for a maximum of 90 days.

#### Summary of Farm Management Applications

The lender survey results were incorporated into the linear programming model through the credit row, and several solutions were obtained. A series of solutions were calculated using a parametric variation of the credit reservation price, and these were used to trace out the liquidity cost curve for the farm. Solutions were then obtained for the farm with (a) no rented wheat pasture, (b) no graze-out steers, (c) varied wheat prices, and (d) varied stocker prices.

As the reservation price for liquidity increased the number of stocker steers in the solutions decreased, while crop acreage remained constant. This reinforces the current feeling that stocker loan demand has decreased due to increases in the liquidity value farmers place on credit in reserve. Returns to the farm and borrowed annual capital decreased as the reservation price increased, which reflects the change in management from a liberal to a conservative credit user.

The liquidity cost curve was found to be negatively sloped, and decreasing at an increasing rate. For credit reserve prices less than \$0.42, the farm was put in the precarious position of having no credit in reserve. Stocker producers running large numbers of cattle may be producing in this area of their liquidity cost curve, and could be vulnerable to sudden needs for large amounts of cash or credit. These producers might benefit by evaluating their own credit situation and recognizing the costs associated with credit in use and reserve.

Rented wheat pasture provided much of the grazing for the stockers in the base solution. To examine the importance of rented pasture to the farm, a solution was obtained with no pasture rental activities. Poor weather, sale of land, and higher rental offers by other farmers might cause rented pasture to become unavailable. The solution under these circumstances relied primarily on fewer numbers of lighter weight, grazeout steers. Crop acreage was unchanged, and returns were decreased by over \$30,000. The credit reserve increased, and the value of credit in reserve would have had to rise from \$0.01 to \$0.61 to cause the new solution to change. Thus, exclusion of pasture rental activities (which may be typical of more conservative farmers) leads to fewer cattle and larger amounts of credit in reserve that are insensitive to low credit reservation price changes.

To examine a situation in which the farm produced stockers to be sold in March instead of May, the grazeout steer activities were excluded from the model and a new solution was calculated. This solution contained increased cow numbers and decreased stocker steer numbers. The price range for the credit reservation price had an upper value of \$0.05, showing that credit in reserve was very sensitive to changes in its' value.

Returns to the farm were decreased by almost 50 percent compared to the base solution, which emphasizes the profitability of grazeout steers in the model.

The sensitivity of the base solution to changes in the price of wheat was evaluated by using several price variations of the wheat price. The results showed that large changes in the price of wheat were necessary to influence the solution. At low wheat prices, more stockers and less wheat was produced, compared to the base solution, and this resulted in high labor, capital and credit requirements and low returns. As the price of wheat increased the number of stockers produced decreased and wheat acreage increased. Labor, capital and credit requirements declined and returns rose.

The prices of stocker steers were also varied. The solution was unresponsive to increases in the price above \$75.00 per hundredweight. The solution did respond to prices below \$75.00, however. At low prices May steers were produced in smaller numbers, using modest amounts of credit and annual capital. As the price increased May steers were produced in increasing numbers, using progressively larger amounts of credit and capital, while increasing returns. This illustrated that the case farm was willing to forego liquidity provided by the credit reserve in exchange for the higher returns provided by the large numbers of grazeout steers.

#### Implications for Further Study

This study has analyzed lender behavior and applied the results of this analysis to a benchmark Oklahoma farm. Farmer's price of credit in reserve were assumed, and the resulting solutions were examined.

Empirical estimates of farmer's actual credit reservation prices might be examined in later studies. These estimates could be used to confirm or refute the conclusion of this study that stocker production has decreased due to increased values placed on credit in reserve. Credit reservation prices could be inferred by surveying farmers to determine their credit usage, and varying the credit reservation price in this model until the actual credit usage occurred. The reservation price at this point would be an estimate of actual values assigned by farmers.

Another area which requires further study concerns crop loans. The interviews conducted in this study found most crop loans to be included in operating lines of credit. A few banks accepted liens on growing crops as their collateral, but most also required liens on machinery and equipment. To more thoroughly investigate crop loans, a survey requesting an operating line of credit could be developed which includes funds for crops. The percentage of crops that lenders are willing to finance could then be determined. A constant percentage of financing was assumed for this study, while in reality lenders may differentiate among various crops, such as wheat versus alfalfa. This could also be investigated using requests for lines of credit by having the lender indicate the funds provided for each crop.

The credit row for the linear programming model was based in part on the premise that lenders impose credit restrictions on farmers such that their debt cannot exceed two times their equity. This value was stated to be typical of lenders in cash grain farm areas, but may be above the limits imposed by Oklahoma agricultural lenders. A maximum debt/equity ratio of one or 1.5 may be a more typical limitation on Oklahoma farmers.

Future studies might consider using strictly mail surveys, eliminating the personal interview. While the response rate for this study was fair, the number of responses was prohibitive to attaching statistical significance to all the variables examined. A larger sample contacted by mail would save money on fuel and phone expenses, and reach a much greater number of lenders.

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## APPENDICES

APPENDIX A

LINEAR PROGRAMMING MATRIX

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MPSCL EXECUTION

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ACTIVITY	B001LV11	H002LV13	H003LV13	B004LV13	B005LV13	B0060273	GZTRN001	B0070276	1....1 ACTIVITY
OBJ1	48,82000-	14,79900-	12,83500-	13,29000-	13,99100-	41,84100-	.	51,09600-	OBJ1
OBJ2	98,17500-	18,62000-	16,13500-	16,59000-	17,81300-	61,41000-	.	70,91100-	OBJ2
OBJ3	98,17500-	18,62000-	16,13500-	16,59000-	17,81300-	61,41000-	.	70,91100-	OBJ3
LANDCL02	.	.	.	.	.	1,00000	.	1,00000	LANDCL02
LABORW01	96900	50000	50800	50800	50000	.	.	.	LABORW01
LABORW02	1,47900	50000	50800	50800	50000	.	.	.	LABORW02
LABORW03	1,56900	50000	50800	50800	50000	.	.	.	LABORW03
LABORW04	47900	50000	.	.	50000	51100	.	.	LABORW04
LABORW05	51800	50000	.	.	50000	22900	.	.	LABORW05
LABORW06	44800	.	.	.	50000	26900	.	.	LABORW06
LABORW07	44800	.	.	.	.	26100	.	1,14700	LABORW07
LABORW08	30800	.	.	.	.	47000	.	68100	LABORW08
LABORW09	42800	.	.	.	.	.	.	52800	LABORW09
LABORW10	47800	.	.	.	.	64800	.	60100	LABORW10
LABORW11	74900	70000	70800	20800	70000	.	.	.	LABORW11
LABORW12	90900	50000	50800	70800	50000	.	.	.	LABORW12
CAPITAL1	50,46800	121,83600	139,71000	113,29400	171,11700	15,85700	.	29,20600	CAPITAL1
CAPITAL2	926,89300	20,29800	17,25800	17,25800	20,29800	137,98900	.	138,79800	CAPITAL2
CREDIT01	67,28000	60,34000	87,73000	74,35000	75,43000	10,04000	.	12,26000	CREDIT01
MMCONS01	1,00000	.	.	.	.	1,00000	.	.	MMCONS01
MMCONS03	2,02400-	.	.	.	.	.	.	.	MMCONS03
BS013001	1,39200-	.	.	.	.	.	.	.	BS013001
BS012002	95000-	.	.	.	.	.	.	.	BS012002
BS018003	16000-	.	.	.	.	.	.	.	BS018003
BS017004	338,24000	50,00000	50,00000	45,00000	50,00000	.	.	.	BS017004
BS015005	15000	15000	15000	15000	15000	.	.	.	BS015005
BS085006	17900	16,25000	11,25000	11,25000	16,25000	.	.	.	BS085006
BS103007	26,86000	.	.	.	.	.	.	.	BS103007
BS014008	16000	5,14100-	5,00000	4,00000	6,64400-	.	.	.	BS014008
BS016009	.	.	.	.	4,00000	.	.	.	BS016009
BS013010	.	2,75000	60000	60000	60000	.	.	.	BS013010
BS013011	.	60000	6,54600-	5,53700-	60000	.	.	.	BS013011
BS129011	.	.	.	.	.	.	.	.	BS129011
BS016012	.	.	.	.	.	.	.	.	BS016012
BS073013	.	.	.	.	.	24,00000-	.	.	BS073013
BS076014	.	.	.	.	.	1,00000-	.	32,00000-	BS076014
GTRAN001	.	.	.	.	.	.	1,00000	.	GTRAN001
GTRAN002	.	.	.	.	.	.	.	1,00000-	GTRAN002
PASTUR01	.	1,18000	1,94000	1,58000	1,58000	.	.	.	PASTUR01
PASTUR02	.	89000	33000	27000	1,16000	.	.	.	PASTUR02
PASTUR03	2,24000	26000	.	.	33000	.	.	.	PASTUR03
PASTUR04	36000	.	.	.	.	.	.	.	PASTUR04
PASTUR05	60000	28000	50000	40000	50000	.	.	.	PASTUR05
PASTUR06	2,24000	.	.	.	.	.	20000-	.	PASTUR06

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OBJ2	.	70.91100-	.	149.84500-	.	128.89200-	.	2.13400-	OBJ2
OBJ3	.	70.91100-	.	149.84500-	.	128.89200-	.	2.13400-	OBJ3
LANDCL01	.	.	.	.	.	.	.	1.00000	LANDCL01
LANDCL02	.	.	.	1.00000	.	1.00000	.	.	LANDCL02
LANDCL03	.	1.00000	.	.	.	.25600	.	.	LANDCL03
LABORW02	.	.34100	.	.25600	.	.	.	.	LABORW02
LABORW04	.	.	.	.	.	.	.	.18000	LABORW04
LABORW05	.	.	.	1.26200	.	1.26200	.	.	LABORW05
LABORW06	.	.94700	.	1.39000	.	1.39000	.	.	LABORW06
LABORW07	.	.68100	.	.09000	.	.09000	.	.	LABORW07
LABORW08	.	.52800	.	1.46400	.	.26200	.	.	LABORW08
LABORW09	.	.60100	.	1.31400	.	1.31400	.	.	LABORW09
CAPITAL1	.	29.20600	.	5.59900	.	7.50100	.	.27800	CAPITAL1
CAPITAL2	.	138.79800	.	218.39200	.	162.86600	.	3.21400	CAPITAL2
CREDIT01	.	12.26000	.	24.55000	.	22.18000	.	.	CREDIT01
MMCONS02	.	.	.	1.00000	.	1.00000	.	.	MMCONS02
HS076014	.	27.00000-	.	.	.	.	.	.	HS076014
HS081015	.	.	.	4.00000-	.	3.00000-	.	.	HS081015
GTRAN002	1.00000	.	.	.	.	.	.	.	GTRAN002
GTRAN003	.	1.00000-	1.00000	.	.	.	.	.	GTRAN003
GTRAN004	.	.	.	1.00000-	1.00000	1.00000-	1.00000	.	GTRAN004
GTRAN005	.	.	.	.	.	.	.	.	GTRAN005
GTRAN006	.	.	.	.	.	.	.	.	GTRAN006
PASTUR01	.75000-	.	.70000-	.	.	.	.	1.00000-	PASTUR01
PASTUR05	.	.	.	.	.20000-	.	.20000-	.	PASTUR05

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ACTIVITY	GZTRN006	B0120289	GZTRN007	B0130389	GZTRN008	B0140373	GZTRN009	LHIRE101	3....1 ACTIVITY
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OBJ2	.	52.49800-	.	52.49800-	.	61.41000-	.	4.00000-	OBJ2
OBJ3	.	52.49800-	.	52.49800-	.	61.41000-	.	4.00000-	OBJ3
LANDCL02	.	1.00000	.	1.00000	.	1.00000	.	1.00000-	LANDCL02
LANDCL03	.	.	.	.	.	.	.	.	LANDCL03
LABORW01	.	.	.	.	.	.	.	.	LABORW01
LABORW03	.	34100	.	34100	.	51100	.	.	LABORW03
LABORW04	.	.	.	.	.	22900	.	.	LABORW04
LABORW05	.	.	.	.	.	26900	.	.	LABORW05
LABORW06	.	51900	.	51900	.	26100	.	.	LABORW06
LABORW07	.	68100	.	68100	.	47000	.	.	LABORW07
LABORW08	.	52800	.	52800	.	.	.	.	LABORW08
LABORW09	.	60100	.	60100	.	.	.	.	LABORW09
LABORW10	.	.	.	.	.	64800	.	.	LABORW10
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CAPITAL1	.	21.59100	.	21.59100	.	15.85700	.	.	CAPITAL1
CAPITAL2	.	65.61300	.	65.61300	.	137.98900	.	.	CAPITAL2
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GTRAN007	.	1.00000-	1.00000	.	.	.	.	.	GTRAN007
GTRAN008	.	.	.	1.00000-	1.00000	.	.	.	GTRAN008
GTRAN009	.	.	.	.	.	1.00000-	1.00000	.	GTRAN009
PASTUR01	.	.	75000-	.	65000-	.	.	.	PASTUR01
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PASTUR04	36000-	.	.	.	.	.	.	.	PASTUR04
PASTUR05	24000-	.	.	.	.	.	20000-	.	PASTUR05
PASTUR06	24000-	.	.	.	.	.	.	.	PASTUR06

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ACTIVITY	LHIRE201	LHIRE102	LHIRE202	LHIRE103	LHIRE203	LHIRE104	LHIRE204	LHIRE105	4...1 ACTIVITY
OBJ1	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ1
OBJ2	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ2
OBJ3	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ3
LABORW01	1.00000-		1.00000-						LABORW01
LABORW02		1.00000-		1.00000-	1.00000-				LABORW02
LABORW03						1.00000-	1.00000-		LABORW03
LABORW04								1.00000-	LABORW04
LABORW05									LABORW05
MH2PER01	1.00000							1.00000-	MH2PER01
MH1PER02		1.00000	1.00000	1.00000					MH1PER02
MH2PER02					1.00000				MH2PER02
MH1PER03									MH1PER03
MH2PER03									MH2PER03
MH1PER04						1.00000			MH1PER04
MH2PER04							1.00000		MH2PER04
MH1PER05								1.00000	MH1PER05



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ACTIVITY	LHIRE205	LHIRE106	LHIRE206	LHIRE107	LHIRE207	LHIRE108	LHIRE208	LHIRE109	5...1 ACTIVITY
OBJ1	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ1
OBJ2	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ2
OBJ3	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	OBJ3
LABORW05	1.00000-	1.00000-	1.00000-	1.00000-	1.00000-	1.00000-	1.00000-	1.00000-	LABORW05
LABORW06	.	.	.	.	.	.	.	.	LABORW06
LABORW07	.	.	.	.	.	.	.	.	LABORW07
LABORW08	.	.	.	.	.	.	.	.	LABORW08
LABORW09	.	.	.	.	.	.	.	.	LABORW09
MH2PER05	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	MH2PER05
MH1PER06	.	.	.	.	.	.	.	.	MH1PER06
MH2PER06	.	.	.	.	.	.	.	.	MH2PER06
MH1PER07	.	.	.	.	.	.	.	.	MH1PER07
MH2PER07	.	.	.	.	.	.	.	.	MH2PER07
MH1PER08	.	.	.	.	.	.	.	.	MH1PER08
MH2PER08	.	.	.	.	.	.	.	.	MH2PER08
MH1PER09	.	.	.	.	.	.	.	.	MH1PER09

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ACTIVITY	LHIRE209	LHIRE110	LHIRE210	LHIRE111	LHIRE211	LHIRE112	LHIRE212	CAP1BOR1	ACTIVITY
UBJ1	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	.12100-	UBJ1
UBJ2	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	.12100-	UBJ2
UBJ3	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	4.00000-	5.20000-	.12100-	UBJ3
LABORW09	1.00000-								LABORW09
LABORW10		1.00000-	1.00000-						LABORW10
LABORW11				1.00000-	1.00000-				LABORW11
LABORW12						1.00000-	1.00000-		LABORW12
MH2PER09	1.00000								MH2PER09
MH1PER10		1.00000							MH1PER10
MH2PER10			1.00000						MH2PER10
MH1PER11				1.00000					MH1PER11
MH2PER11					1.00000				MH2PER11
MH1PER12						1.00000			MH1PER12
MH2PER12							1.00000		MH2PER12
CAPITAL1								1.00000-	CAPITAL1

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ACTIVITY	CAP2BOR1	CAP3BOR1	COPPOR01	COPPOR02	COPPOR03	CREDRES1	SL013001	SL012002	7:..:1 ACTIVITY
OBJ1	.	.	.05200	.	.	.01000	80.46000	64.77000	OBJ1
OBJ2	.13800-	.	.05200	.10500	.	.01000	80.46000	64.77000	OBJ2
OBJ3	.13800-	.13000-	.05200	.10500	.12700	.01000	80.46000	64.77000	OBJ3
CAPITAL1	.	.	1.00000	.	.	.	.	.	CAPITAL1
CAPITAL2	1.00000-	.	.	1.00000	.	.	.	.	CAPITAL2
CAPITAL3	.	1.00000-	.	.	1.00000	.	.	.	CAPITAL3
CREDIT01	.	.	.	.	.	1.00000	.	.	CREDIT01
BS013001	.	.	.	.	.	.	1.00000	.	BS013001
BS012002	.	.	.	.	.	.	.	1.00000	BS012002

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ACTIVITY	SL018003	SL017004	BY115005	BY085006	BY103007	BY014008	SL016009	BY013010	8...1 ACTIVITY
OBJ1	46.01000	57.81000	.14000-	76.00000-	.10000-	90.00000-	75.75000	80.55000-	OBJ1
OBJ2	46.01000	57.81000	.14000-	76.00000-	.10000-	90.00000-	75.75000	80.55000-	OBJ2
OBJ3	46.01000	57.81000	.14000-	76.00000-	.10000-	90.00000-	75.75000	80.55000-	OBJ3
BS018003	1.00000								BS018003
BS017004		1.00000							BS017004
BS115005			1.00000-						BS115005
BS085006				1.00000-					BS085006
BS103007					1.00000-				BS103007
BS014008						1.00000-			BS014008
BS016009							1.00000		BS016009
BS013010								1.00000-	BS013010

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ACTIVITY	BY013011	BY129011	SL016012	SL073013	SL076014	SL081015	AUMRENT1	AUMRENT2	9...1 ACTIVITY
OBJ1	90.46000-	8.00000-	75.00000	5.50000	4.05000	75.00000	20.39000-	22.07000-	OBJ1
OBJ2	90.46000-	8.00000-	75.00000	5.50000	4.05000	75.00000	20.39000-	22.07000-	OBJ2
OBJ3	90.46000-	8.00000-	75.00000	5.50000	4.05000	75.00000	20.39000-	22.07000-	OBJ3
BS013011	1.00000-	1.00000-	.	.	.	.	.	.	BS013011
BS129011	.	.	.	.	.	.	.	.	BS129011
BS016012	.	.	1.00000	.	.	.	.	.	BS016012
BS073013	.	.	.	1.00000	.	.	.	.	BS073013
BS076014	.	.	.	.	1.00000	.	.	.	BS076014
BS081015	.	.	.	.	.	1.00000	.	.	BS081015
PASTUR01	.	.	.	.	.	.	1.00000-	.	PASTUR01
PASTUR02	.	.	.	.	.	.	.	1.00000-	PASTUR02

ACTIVITY	AUMRENT3	RENTNAT4	RENTNAT5	RENTNAT6	HAYTRAN1	RHS1	ACTIVITY
OBJ1	22.07000-	8.33000-	9.26000-	8.33000-	.	.	OBJ1
OBJ2	22.07000-	8.33000-	9.26000-	8.33000-	.	.	OBJ2
OBJ3	22.07000-	8.33000-	9.26000-	8.33000-	.	.	OBJ3
LANDCL01	.	.	.	.	.	260.00000	LANDCL01
LANDCL02	.	.	.	.	.	600.00000	LANDCL02
LANDCL03	.	.	.	.	.	420.00000	LANDCL03
LABORW01	.	.	.	.	.	160.00000	LABORW01
LABORW02	.	.	.	.	.	160.00000	LABORW02
LABORW03	.	.	.	.	.	160.00000	LABORW03
LABORW04	.	.	.	.	.	160.00000	LABORW04
LABORW05	.	.	.	.	.	160.00000	LABORW05
LABORW06	.	.	.	.	.	320.00000	LABORW06
LABORW07	.	.	.	.	.	320.00000	LABORW07
LABORW08	.	.	.	.	.	320.00000	LABORW08
LABORW09	.	.	.	.	.	160.00000	LABORW09
LABORW10	.	.	.	.	.	160.00000	LABORW10
LABORW11	.	.	.	.	.	160.00000	LABORW11
LABORW12	.	.	.	.	.	160.00000	LABORW12
MH1PER01	.	.	.	.	.	160.00000	MH1PER01
MH2PER01	.	.	.	.	.	320.00000	MH2PER01
MH1PER02	.	.	.	.	.	160.00000	MH1PER02
MH2PER02	.	.	.	.	.	320.00000	MH2PER02
MH1PER03	.	.	.	.	.	160.00000	MH1PER03
MH2PER03	.	.	.	.	.	320.00000	MH2PER03
MH1PER04	.	.	.	.	.	160.00000	MH1PER04
MH2PER04	.	.	.	.	.	320.00000	MH2PER04
MH1PER05	.	.	.	.	.	160.00000	MH1PER05
MH2PER05	.	.	.	.	.	320.00000	MH2PER05
MH1PER06	.	.	.	.	.	160.00000	MH1PER06
MH2PER06	.	.	.	.	.	320.00000	MH2PER06
MH1PER07	.	.	.	.	.	160.00000	MH1PER07
MH2PER07	.	.	.	.	.	320.00000	MH2PER07
MH1PER08	.	.	.	.	.	160.00000	MH1PER08
MH2PER08	.	.	.	.	.	320.00000	MH2PER08
MH1PER09	.	.	.	.	.	160.00000	MH1PER09
MH2PER09	.	.	.	.	.	320.00000	MH2PER09
MH1PER10	.	.	.	.	.	160.00000	MH1PER10
MH2PER10	.	.	.	.	.	320.00000	MH2PER10
MH1PER11	.	.	.	.	.	160.00000	MH1PER11
MH2PER11	.	.	.	.	.	320.00000	MH2PER11
MH1PER12	.	.	.	.	.	160.00000	MH1PER12
MH2PER12	.	.	.	.	.	320.00000	MH2PER12
CAPITAL3	.	.	.	.	.	100000.00	CAPITAL3
CREDIT01	.	.	.	.	.	133000.00	CREDIT01
MMCONS01	.	.	.	.	.	160.00000	MMCONS01
MMCONS02	.	.	.	.	.	120.00000	MMCONS02
MMCONS03	.	.	.	.	.	20.00000	MMCONS03
BS0A5006	.	.	.	.	1.00000-	.	BS0A5006
BS0A1015	.	.	.	.	1.00000	.	BS0A1015
PASTUR03	1.00000-	.	.	.	.	.	PASTUR03
PASTUR04	.	1.00000-	.	.	.	.	PASTUR04

10....1

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ACTIVITY	AUMRENT3	RENTNAT4	RENTNAT5	RENTNAT6	HAYTRAN1	RHS1
PASTUR05	.	.	1.000000-	1.000000-	.	.
PASTUR06	.	.	.	.	.	.

ACTIVITY  
PASTUR05  
PASTUR06

10....2

APPENDIX B

LENDER SURVEY



Department of Agricultural Economics

Oklahoma State University

INTRODUCTION

The attached material pertains to farm situations for hypothetical farmers. Please consider each case as for a customer of your bank with personal background as described below for Mr. Tom Smith. He has used your bank since starting to farm, and he maintains a checking and savings account with your bank. Six independent farm cases are presented. Each case includes supporting financial statements. Please consider each case separately and complete the blanks as appropriate.

## BIOGRAPHY

## North Central Oklahoma Farm

Mr. Tom Smith

Mr. Smith is 35 years old, and a native of north central Oklahoma. He has been married 14 years and has two children. He graduated from Oklahoma State University in 1966, where he obtained a Bachelor's degree in Animal Science.

Mr. Smith began farming with his father's family farm operation during his college years. He started farming in 1970 on his own. He began with 260 acres given to him by his parents, and currently farms 1280 acres. The ownership situation of this land is as follows:

420 acres cropland - leased

260 acres pasture - owned

600 acres cropland - purchased in 1976 with a loan from the

---

Federal Land Bank

1,280 acres.

The leased land is paid for on a cash rent basis, with annual payments made to the lessor in July. Mr. Smith also has at his disposal additional rented wheat pasture to provide grazing for his stocker steers.

The proposed farm plan for the next year is shown below.

A. Livestock: 20 head of beef cows

851 stocker steers

B. Cropland: 160 acres Grain Sorghum

120 acres Alfalfa

450 acres Wheat

C. Pasture: 260 acres Native Pasture

290 acres Small Grain Grazeout

350 acres Rented Wheat Grazing

Mr. Smith has a good credit rating, due to both his management ability and personal characteristics. He is respected by his neighbors and has excellent personal references.

## Department of Agricultural Economics

Oklahoma State University

## LENDER SURVEY

Date \_\_\_\_\_

1. Name \_\_\_\_\_ Title \_\_\_\_\_
2. Name of Bank \_\_\_\_\_  
Deposits \_\_\_\_\_
3. Lending Responsibilities \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Agricultural Background \_\_\_\_\_  
\_\_\_\_\_  
Educational Background \_\_\_\_\_
5. What Percent of your bank's total net loans are agricultural loans?  
\_\_\_\_\_ Outlook for the future of agricultural loans?  
( ) Increase ( ) Remain the Same ( ) Decrease
6. Rank agricultural lending from the point of view of:  
A. The risk involved:  
( ) High Risk ( ) Moderate Risk ( ) Low Risk  
B. Profitability:  
( ) Highly Profitable ( ) Moderately Profitable ( ) Low Profit
7. Experience with Stocker Loans \_\_\_\_\_
8. Describe your lending practices for stocker cattle to go on wheat pasture.  
A. Rules of thumb on: \_\_\_\_\_

1. Financial statements or documentation necessary \_\_\_\_\_

\_\_\_\_\_

2. Collateral Required (Cattle purchased?) \_\_\_\_\_

\_\_\_\_\_

3. Stocking Rates, Number of Cattle \_\_\_\_\_

\_\_\_\_\_

4. Describe any other requirements (such as pasture available,  
hedging, contracting) \_\_\_\_\_

\_\_\_\_\_

5. Percent Financed \_\_\_\_\_

Based on ( ) cash cost ( ) expected sale value ( ) other

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. How would you describe your lending practices for crops?

A. Rules of thumb:

1. Percent Financed \_\_\_\_\_

Based on ( ) cash cost ( ) expected sale value ( ) other

2. Collateral Required \_\_\_\_\_

\_\_\_\_\_

3. Financial statements or documentation necessary \_\_\_\_\_

\_\_\_\_\_

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

LOAN REQUEST  
September 1, 1981  
Case A

1. Using the financial statements for Case A, examine the following loan request and indicate the loan granted for the coming production year.

- A. Stocker Steers - The steers will be purchased on November 15, and will graze on wheat pasture from January until they are sold in May.

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	400	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

C. Total -	<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
	291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_

BALANCE SHEET  
September 1, 1981

Case A

<u>Current Assets</u>		<u>Current Liabilities</u>	
Cash	<u>11,638</u>	Interest Payable on	
Leased Land	<u>10,760</u>	Intermediate Notes	<u>2,332</u>
Cash Value Life Insurance	<u>10,550</u>	Long Term Loans	<u>37,803</u>
Stored Crops:		Notes Payable	<u>0</u>
Wheat	<u>19,664</u>	Principal Payments Due on	
Alfalfa Hay	<u>9,848</u>	Intermediate Notes	<u>2,395</u>
Livestock to be Sold:		Long Term Loans	<u>2,526</u>
Calves - Hfrs.	<u>1,824</u>	TOTAL CURRENT LIABILITIES	<u>45,056</u>
Strs.	<u>3,522</u>		
Cows	<u>875</u>	<u>Intermediate Liabilities</u>	
Feed, Seed, Fertilizer	<u>2,813</u>		
TOTAL CURRENT ASSETS	<u>71,444</u>	Machinery and Equipment	
		Notes	<u>17,038</u>
<u>Intermediate Assets</u>		CCC Loans	<u>19,664</u>
Breeding Livestock	<u>6,600</u>	TOTAL INTERMEDIATE LIABILITIES	<u>36,702</u>
Machinery and Equipment	<u>91,415</u>		
TOTAL INTERMEDIATE ASSETS	<u>98,015</u>	<u>Long Term Liabilities</u>	
		Land Loans	<u>470,010</u>
<u>Fixed Assets</u>		TOTAL LIABILITIES	<u>551,768</u>
Land (including buildings)		NET WORTH	<u>501,691</u>
Pasture	<u>104,000</u>		
Class I + II	<u>780,000</u>	TOTAL LIABILITIES AND NET WORTH	<u>1,053,459</u>
TOTAL FIXED ASSETS	<u>884,000</u>		
TOTAL ASSETS	<u>1,053,459</u>		

## INCOME STATEMENT

## Case A

<u>Receipts</u>					<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
	20	220	3.20	19,664		32	30	4.05	3,888
Wheat	27	230	3.65	22,722	Wheat	27	420	4.05	45,927
Hay	4	87	70.00	24,360	Hay	4	120	75.00	36,000
Grain Sorghum	24	160	4.95	19,008	Grain Sorghum	24	160	5.50	21,120
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves - Steers	9	4.60	74.80	3,097	Calves - Steers	9	4.60	80.46	3,331
Heifers	6	4.35	58.83	1,535	Heifers	6	4.45	64.77	1,730
Stockers	301	5.14	68.80	106,443	Stockers	851	6.64	75.75	428,319
Cows	2	9.50	41.79	794	Cows	2	9.50	46.01	874
					Bulls	1	3.20	57.81	185
Total Receipts				197,623	Total Receipts				541,374
<u>Expenses</u>									
Operating Expenses				118,939	Operating Expenses				430,201
Interest Expenses					Interest Expenses				
Real Estate				37,990	Real Estate				37,803
Machinery				2,588	Machinery				2,332
Operating Loan				5,902	Operating Loan				22,550
Total Cash Expenses				165,419	Total Cash Expenses				492,886
Net Cash Income				32,204	Net Cash Income				48,488
Depreciation				9,802	Depreciation				9,802
Net Income				22,402	Net Income				38,686
Income Taxes (Federal and State)				4,191	Income Taxes (Federal and State)				10,289
Income After Taxes				18,211	Income After Taxes				28,397
Family Living Expense				12,000	Family Living Expense				12,000
Retained Earnings				6,271	Retained Earnings				16,397

PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case A

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	40,135	0	0	0	0	0	0	0	0	0	0	0	40,135
Principal Payment (land and machinery)	4,921	0	0	0	0	0	0	0	0	0	0	0	4,921
Total Cash Outflow	72,541	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	487,545
Cash Difference	-63,356	7,916	-288,119	-4,666	-4,380	-17,836	-21,335	-5,462	420,956	49,526	-18,150	-1,166	53,829
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	12,706	62,232	44,082	
Cash Position	-51,718	8,316	-287,719	-4,266	-3,980	-17,436	-20,935	-5,062	421,256	62,232	44,082	42,916	
Money Borrowed This Period	52,118	0	288,119	4,666	4,380	17,836	21,335	5,462	0	0	0	0	393,916
Principal Paid on Operating Loan	0	7,391	0	0	0	0	0	0	386,525	0	0	0	393,916
Interest Paid on Operating Loan	0	526	0	0	0	0	0	0	22,025	0	0	0	22,550
Ending Cash Balance	400	400	400	400	400	400	400	400	12,706	62,232	44,082	42,916	42,916
Accumulated Borrowing	52,118	44,727	332,512	337,512	341,892	359,728	381,063	386,525	0	0	0	0	386,525

Final Cash Balance  
42,916  
Maximum Accumulated  
Borrowing  
386,525



Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

LOAN REQUEST  
September 1, 1981  
Case B

1. For the following case, the loan request includes both a cattle loan and a new combine loan. The specifications of the combine are listed in the loan request. The steers will again be purchased on November 15 and grazed on wheat pasture from January until they are sold in May. Please indicate the loan granted for both the steers and the combine.

## A. Stocker Steers

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	4.00	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

## C. Total Steer Loan -

<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CAPITAL LOAN

Item: Self-propelled Grain Combine

Width: Twenty-four feet

List Price: \$68,500.00

Purchase Price: \$61,650.00

Expected Life: 10 years

- |    |                               |                             |
|----|-------------------------------|-----------------------------|
| 1. | <u>Capital Loan Requested</u> | <u>Capital Loan Granted</u> |
|    | \$61,650.00                   | _____                       |
2. Interest Rate on Capital Loan \_\_\_\_\_
3. Loan Length \_\_\_\_\_  
Payment Type (Annual, Monthly, etc.) \_\_\_\_\_
4. Security or Collateral Requirements \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Other Applicable Conditions \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

BALANCE SHEET  
September 1, 1981

Case B

<u>Current Assets</u>		<u>Current Liabilities</u>	
Cash	<u>11,638</u>	Interest Payable on	
Leased Land	<u>10,760</u>	Intermediate Notes	<u>4,584</u>
Cash Value Life Insurance	<u>10,500</u>	Long Term Loans	<u>40,893</u>
Stored Crops:		Notes Payable	<u>0</u>
Wheat	<u>19,664</u>	Principal Payments Due on	
Alfalfa Hay	<u>9,848</u>	Intermediate Notes	<u>4,707</u>
Livestock to be Sold:		Long Term Loans	<u>2,517</u>
Calves - Hfrs.	<u>1,824</u>	TOTAL CURRENT LIABILITIES	<u>52,701</u>
Strs.	<u>3,522</u>		
Cows	<u>875</u>	<u>Intermediate Liabilities</u>	
Feed, Seed, Fertilizer	<u>2,813</u>	Machinery and Equipment	
TOTAL CURRENT ASSETS	<u>71,444</u>	Notes	<u>33,491</u>
		CCC Loans	<u>19,664</u>
<u>Intermediate Assets</u>		TOTAL INTERMEDIATE LIABILITIES	<u>53,155</u>
Breeding Livestock	<u>6,600</u>	<u>Long Term Liabilities</u>	
Machinery and Equipment	<u>91,415</u>	Land Loans	<u>508,646</u>
TOTAL INTERMEDIATE ASSETS	<u>98,015</u>	TOTAL LIABILITIES	<u>614,502</u>
		NET WORTH	<u>438,957</u>
<u>Fixed Assets</u>		TOTAL LIABILITIES AND NET WORTH	<u>1,053,459</u>
Land (including buildings)			
Pasture	<u>104,000</u>		
Class I + II	<u>780,000</u>		
TOTAL FIXED ASSETS	<u>884,000</u>		
TOTAL ASSETS	<u>1,053,459</u>		

## INCOME STATEMENT

## Case B

<u>Receipts</u>					<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
Wheat	28	220	3.20	19,664	Wheat	32	30	4.05	3,888
	27	230	3.65	22,722		27	420	4.05	45,927
Hay	4	87	70.00	24,360	Hay	4	120	75.00	36,000
Grain Sorghum	24	160	4.95	19,008	Grain Sorghum	24	160	5.50	21,120
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves - Steers	9	4.60	74.80	3,097	Calves - Steers	9	4.60	80.46	3,331
Heifers	6	4.35	58.83	1,535	Heifers	6	4.45	64.77	1,730
Stockers	301	5.14	68.80	106,443	Stockers	851	6.64	75.75	428,319
Cows	2	9.50	41.79	794	Cows	2	9.50	46.01	874
					Bulls	1	3.20	57.81	185
Total Receipts				197,623	Total Receipts				541,374
<u>Expenses</u>									
Operating Expenses				118,939	Operating Expenses				430,201
Interest Expenses					Interest Expenses				
Real Estate				41,080	Real Estate				40,893
Machinery				5,088	Machinery				4,584
Operating Loan				5,902	Operating Loan				23,173
Total Cash Expenses				165,419	Total Cash Expenses				498,851
Net Cash Income				32,204	Net Cash Income				42,523
Depreciation				9,802	Depreciation				9,802
Net Income				22,402	Net Income				32,721
Income Taxes (Federal and State)				4,191	Income Taxes (Federal and State)				7,788
Income After Taxes				18,211	Income After Taxes				24,933
Family Living Expense				12,000	Family Living Expense				12,000
Retained Earnings				6,271	Retained Earnings				12,933

PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case B

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	45,477	0	0	0	0	0	0	0	0	0	0	0	45,477
Principal Payment (land and machinery)	7,224	0	0	0	0	0	0	0	0	0	0	0	7,224
Total Cash Outflow	80,186	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	495,191
Cash Difference	-71,001	7,916	-288,119	-4,666	-4,380	-17,836	-21,335	-5,462	420,856	49,526	-18,150	-1,166	46,183
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	4,438	53,964	35,814	
Cash Position	-59,363	8,316	-287,719	-4,266	-3,980	-17,436	-20,935	-5,062	421,256	53,964	35,814	34,648	
Money Borrowed This Period	-59,763	0	288,119	4,666	4,380	17,836	21,335	5,462	0	0	0	0	401,561
Principal Paid on Operating Loan	0	7,313	0	0	0	0	0	0	394,248	0	0	0	401,561
Interest Paid on Operating Loan	0	603	0	0	0	0	0	0	22,570	0	0	0	23,173
Ending Cash Balance	400	400	400	400	400	400	400	400	4,438	53,964	35,648	34,648	Final Balance 34,648
Accumulated Borrowing	59,763	52,450	340,569	345,235	349,615	367,451	388,786	394,248	0	0	0	0	Maximum Accumulated Borrowing 394,248

LOAN REQUEST  
September 1, 1981  
Case C

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

1. Using the financial statements for Case C, examine the following loan request and indicate the loan granted for the coming production year. The steers will be purchased on November 15 and grazed on wheat pasture from January until May, when they will be sold.

## A. Stocker Steers -

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	4.00	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

## C. Total -

<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
291,824.92	_____

2. Interest Rate \_\_\_\_\_
3. Loan Length \_\_\_\_\_  
Payment Type (Annual, Monthly, etc.) \_\_\_\_\_
4. Security or Collateral Requirements \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Other Applicable Conditions \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

BALANCE SHEET  
September 1, 1981

Case C

Current Assets

Cash	<u>11,638</u>
Leased Land	<u>10,760</u>
Cash Value Life Insurance	<u>0</u>
Stored Crops:	
Wheat	<u>          </u>
Alfalfa Hay	<u>9,848</u>
Livestock to be Sold:	
Calves - Hfrs.	<u>1,824</u>
Strs.	<u>3,522</u>
Cows	<u>875</u>
Feed, Seed, Fertilizer	<u>2,813</u>
TOTAL CURRENT ASSETS	<u>41,280</u>

Intermediate Assets

Breeding Livestock	<u>6,600</u>
Machinery and Equipment	<u>91,415</u>
TOTAL INTERMEDIATE ASSETS	<u>98,015</u>

Fixed Assets

Land (including buildings)	
Pasture	<u>104,000</u>
Class I + II	<u>780,000</u>
TOTAL FIXED ASSETS	<u>884,000</u>
TOTAL ASSETS	<u>1,023,295</u>

Current Liabilities

Interest Payable on	
Intermediate Notes	<u>6,620</u>
Long Term Loans	<u>45,172</u>
Notes Payable	<u>          </u>
Principal Payments Due on	
Intermediate Notes	<u>3,734</u>
Long Term Loans	<u>7,724</u>
TOTAL CURRENT LIABILITIES	<u>63,250</u>

Intermediate Liabilities

Machinery and Equipment	
Notes	<u>51,433</u>
CCC Loans	<u>          </u>
TOTAL INTERMEDIATE LIABILITIES	<u>51,433</u>

Long Term Liabilities

Land Loans	<u>556,928</u>
TOTAL LIABILITIES	<u>671,611</u>
NET WORTH	<u>351,684</u>
TOTAL LIABILITIES AND NET WORTH	<u>1,023,295</u>

## INCOME STATEMENT

## Case C

<u>Receipts</u>					<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
	32	30	3.70	3,552		32	30	4.05	3,888
Wheat	27	420	3.70	41,958	Wheat	27	420	4.05	45,927
Hay	4	87	70.00	24,360	Hay	4	120	75.00	36,000
Grain Sorghum	24	160	4.95	19,008	Grain Sorghum	24	160	5.50	21,120
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves - Steers	9	4.60	74.80	3,097	Calves - Steers	9	4.60	80.46	3,331
Heifers	6	4.35	58.83	1,535	Heifers	6	4.45	64.77	1,730
Stockers	301	5.14	68.80	106,443	Stockers	851	6.64	75.75	428,319
Cows	2	9.50	41.79	794	Cows	2	9.50	46.01	974
					Bulls	1	4.48	57.81	185
Total Receipts				200,747	Total Receipts				541,374
<u>Expenses</u>									
Operating Expenses				118,939	Operating Expenses				430,201
Interest Expenses					Interest Expenses				
Real Estate				45,744	Real Estate				45,172
Machinery				7,020	Machinery				6,620
Operating Loan				5,902	Operating Loan				24,273
Total Cash Expenses				117,605	Total Cash Expenses				506,266
Net Cash Income				23,142	Net Cash Income				35,108
Depreciation				9,802	Depreciation				9,802
Net Income				13,340	Net Income				25,306
Income Taxes (Federal and State)				1,120	Income Taxes (Federal and State)				5,106
Income After Taxes				12,200	Income After Taxes				20,200
Family Living Expense				12,000	Family Living Expense				12,000
Retained Earnings				220	Retained Earnings				8,200



PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case C

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	51,792	0	0	0	0	0	0	0	0	0	0	0	51,792
Principal Payment (land and machinery)	11,458	0	0	0	0	0	0	0	0	0	0	0	11,458
Total Cash Outflow	90,735	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	505,739
Cash Difference	-81,550	7,916	-288,119	-4,666	-4,381	-17,836	-21,335	-5,462	420,856	49,526	-18,150	-1,166	35,635
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	400	41,614	23,464	
Cash Position	-69,912	8,316	-287,719	-4,266	-3,981	-17,436	-20,935	-5,062	421,256	49,926	23,464	22,298	
Money Borrowed This Period	70,312	0	288,819	4,666	4,381	17,836	21,335	5,462	0	0	0	0	412,811
Principal Paid on Operating Loan	0	7,207	0	0	0	0	0	0	397,375	8,229	0	0	412,811
Interest Paid on Operating Loan	0	709	0	0	0	0	0	0	23,481	83	0	0	24,273
Ending Cash Balance	400	400	400	400	400	400	400	00	400	41,614	23,464	22,298	Final Balance 22,298
Accumulated Borrowing	70,312	63,105	351,924	356,590	360,971	378,807	400,142	405,604	8,229	0	0	0	Maximum Borrowed 405,204

LOAN REQUEST  
September 1, 1981  
Case D

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

1. Using the financial statements for Case D, examine the following loan request and indicate the loan granted for the coming production year. The steers will be purchased on November 15 and grazed on wheat pasture from January until May, when they will be sold.

## A. Stocker Steers -

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	4.00	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

## C. Total -

<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_

BALANCE SHEET  
September 1, 1981

Case D

Current Assets

Cash	400
Leased Land	10,760
Cash Value Life Insurance	10,100
Stored Crops:	
Wheat	_____
Alfalfa Hay	9,848
Livestock to be Sold:	
Calves - Hfrs.	1,824
Strs.	3,522
Cows	875
Feed, Seed, Fertilizer	2,813
TOTAL CURRENT ASSETS	40,142

Intermediate Assets

Breeding Livestock	6,600
Machinery and Equipment	91,415
TOTAL INTERMEDIATE ASSETS	98,015

Fixed Assets

Land (including buildings)	
Pasture	104,000
Class I + II	780,000
TOTAL FIXED ASSETS	884,000
TOTAL ASSETS	1,022,157

Current Liabilities

Interest Payable on	
Intermediate Notes	5,108
Long Term Loans	45,172
Notes Payable	16,939
Principal Payments Due on	
Intermediate Notes	5,245
Long Term Loans	7,724
TOTAL CURRENT LIABILITIES	80,188

Intermediate Liabilities

Machinery and Equipment	
Notes	37,322
CCC Loans	_____
TOTAL INTERMEDIATE LIABILITIES	37,322

Long Term Liabilities

Land Loans	556,438
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TOTAL LIABILITIES	674,438
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NET WORTH	347,719
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TOTAL LIABILITIES AND NET WORTH	1,022,157
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## INCOME STATEMENT

## Case D

<u>Receipts</u>				<u>1981</u>	<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
Wheat	<u>28</u>	<u>235.2</u>	<u>3.90</u>	<u>25,684</u>	Wheat	<u>32</u> <u>27</u>	<u>30</u> <u>420</u>	<u>4.05</u> <u>4.05</u>	<u>3,888</u> <u>45,927</u>
Hay	<u>4</u>	<u>110</u>	<u>75.00</u>	<u>33,000</u>	Hay	<u>4</u>	<u>120</u>	<u>75.00</u>	<u>36,000</u>
Grain Sorghum	<u>24</u>	<u>160</u>	<u>5.05</u>	<u>19,392</u>	Grain Sorghum	<u>24</u>	<u>160</u>	<u>5.50</u>	<u>21,120</u>
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves - Steers	<u>9</u>	<u>4.60</u>	<u>67.32</u>	<u>2,787</u>	Calves - Steers	<u>9</u>	<u>4.60</u>	<u>80.46</u>	<u>3,331</u>
Heifers	<u>6</u>	<u>4.35</u>	<u>52.95</u>	<u>1,382</u>	Heifers	<u>6</u>	<u>4.45</u>	<u>64.77</u>	<u>1,730</u>
Stockers	<u>301</u>	<u>5.14</u>	<u>61.92</u>	<u>95,799</u>	Stockers	<u>851</u>	<u>6.64</u>	<u>75.75</u>	<u>428,319</u>
Cows	<u>2</u>	<u>9.50</u>	<u>37.61</u>	<u>715</u>	Cows	<u>2</u>	<u>9.50</u>	<u>46.01</u>	<u>874</u>
					Bulls	<u>1</u>	<u>3.20</u>	<u>57.81</u>	<u>185</u>
Total Receipts			<u>178,759</u>		Total Receipts			<u>541,374</u>	
<u>Expenses</u>									
Operating Expenses			<u>116,580</u>		Operating Expenses			<u>430,201</u>	
Interest Expenses					Interest Expenses				
Real Estate			<u>45,744</u>		Real Estate			<u>45,172</u>	
Machinery			<u>5,670</u>		Machinery			<u>5,108</u>	
Operating Loan			<u>5,902</u>		Operating Loan			<u>26,890</u>	
Total Cash Expenses			<u>173,896</u>		Total Cash Expenses			<u>507,371</u>	
Net Cash Income			<u>4,863</u>		Net Cash Income			<u>34,003</u>	
Depreciation			<u>9,802</u>		Depreciation			<u>9,802</u>	
Net Income			<u>-4,939</u>		Net Income			<u>24,201</u>	
Income Taxes					Income Taxes				
(Federal and State)			<u>0</u>		(Federal and State)			<u>4,732</u>	
Income After Taxes			<u>-4,939</u>		Income After Taxes			<u>19,469</u>	
Family Living Expense			<u>12,000</u>		Family Living Expense			<u>12,000</u>	
Retained Earnings			<u>-16,939</u>		Retained Earnings			<u>7,469</u>	

PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case D

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	50,280	0	0	0	0	0	0	0	0	0	0	0	50,280
Principal Payment (land and machinery)	12,969	0	0	0	0	0	0	0	0	0	0	0	12,969
Total Cash Outflow	90,734	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	505,738
Cash Difference	-81,549	7,916	-288,119	-4,666	-4,381	-17,836	-21,335	-5,462	420,856	49,562	-18,150	-1,166	35,636
Beginning Cash Bal.	400	400	400	400	400	400	400	400	400	400	11,521	400	
Cash Position	-81,149	8,316	-287,719	-4,266	-3,981	-17,436	-20,935	-5,062	421,256	49,926	-6,629	-766	
Money Borrowed This Period	81,549	0	288,119	4,666	4,381	17,836	21,335	5,462	0	0	7,029	1,166	431,543
Principal Paid on Operating Loan	0	6,752	0	0	0	0	0	0	395,513	38,022	0	0	440,287
Interest Paid on Operating Loan	0	1,164	0	0	0	0	0	0	25,343	383	0	0	26,890
Ending Cash Balance	400	400	400	400	400	400	400	400	400	11,521	400	400	Final Balance 400
Accumulated Borrowing	98,488*	91,736	379,855	384,521	388,902	406,738	428,073	433,535	38,022	0	7,029	8,195	Maximum Borrowed 433,535

\*Consists of outstanding operating loan balance from previous year of \$16,939 in addition to the \$81,549 borrowed in September.

LOAN REQUEST  
September 1, 1981  
Case E

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

1. Suppose Tom Smith now approaches you with the loan request which follows, but he has no previous experience with cattle. Please indicate the loan granted under this condition for the coming production year.

## A. Stocker Steers -

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	4.00	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,32.72	_____

## C. Total -

<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_

BALANCE SHEET  
September 1, 1981

Case E

Current Assets

Cash	<u>11,638</u>
Leased Land	<u>10,760</u>
Cash Value Life Insurance	<u>10,500</u>
Stored Crops:	
Wheat	<u>12,169</u>
Alfalfa Hay	<u>          </u>
Livestock to be Sold:	
Calves - Hfrs.	<u>          </u>
Strs.	<u>          </u>
Cows	<u>          </u>
Feed, Seed, Fertilizer	<u>2,813</u>
TOTAL CURRENT ASSETS	<u>47,880</u>

Intermediate Assets

Breeding Livestock	<u>          </u>
Machinery and Equipment	<u>91,415</u>
TOTAL INTERMEDIATE ASSETS	<u>91,415</u>

Fixed Assets

Land (including buildings)	
Pasture	<u>104,000</u>
Class I + II	<u>780,000</u>
TOTAL FIXED ASSETS	<u>884,000</u>
TOTAL ASSETS	<u>1,023,295</u>

Current Liabilities

Interest Payable on	
Intermediate Notes	<u>6,620</u>
Long Term Loans	<u>45,172</u>
Notes Payable	<u>          </u>
Principal Payments Due on	
Intermediate Notes	<u>3,734</u>
Long Term Loans	<u>          </u>
TOTAL CURRENT LIABILITIES	<u>63,250</u>

Intermediate Liabilities

Machinery and Equipment	
Notes	<u>51,433</u>
CCC Loans	<u>          </u>
TOTAL INTERMEDIATE LIABILITIES	<u>51,544</u>

Long Term Liabilities

Land Loans	<u>556,928</u>
TOTAL LIABILITIES	<u>671,611</u>
NET WORTH	<u>351,684</u>
TOTAL LIABILITIES AND NET WORTH	<u>1,023,295</u>

## INCOME STATEMENT

## Case E

<u>Receipts</u>					<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
	32	290	3.70	34,336		32	30	4.05	3,888
Wheat	27	310	3.70	30,969	Wheat	27	420	4.05	45,927
						27	111	4.05	12,169
Hay	4	120	70.00	33,600	Hay	4	120	75.00	36,000
Grain					Grain				
Sorghum	24	160	4.95	19,008	Sorghum	24	160	5.50	21,120
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves -					Calves -				
Steers					Steers				
Heifers					Heifers				
Stockers					Stockers	851	6.64	75.75	428,319
Cows					Cows				
					Bulls				
Total Receipts				117,913	Total Receipts				547,423
<u>Expenses</u>									
Operating Expenses				36,817	Operating Expenses				428,502
Interest Expenses					Interest Expenses				
Real Estate				45,744	Real Estate				45,172
Machinery				7,020	Machinery				6,620
Operating Loan				5,902	Operating Loan				24,329
Total Cash Expenses				110,875	Total Cash Expenses				504,623
Net Cash Income				22,430	Net Cash Income				42,800
Depreciation				9,141	Depreciation				9,141
Net Income				13,289	Net Income				33,659
Income Taxes					Income Taxes				
(Federal and State)				1,090	(Federal and State)				8,149
Income After Taxes				12,199	Income After Taxes				25,510
Family Living Expense				12,000	Family Living Expense				12,000
Retained Earnings				199	Retained Earnings				13,510



PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case E

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,000	21,120	0	0	0	0	0	12,169	437,319	58,815	0	9,000	547,423
Total Operating Expenses	26,449	17,436	286,980	3,373	3,373	16,616	20,415	4,324	15,045	8,253	17,115	9,130	428,502
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense													
Interest Expense (land and machinery)	51,792	0	0	0	0	0	0	0	0	0	0	0	51,792
Principal Payment (land and machinery)	11,458	0	0	0	0	0	0	0	0	0	0	0	11,458
Total Cash Outflow	90,699	18,436	287,980	4,367	4,373	17,616	21,415	5,324	16,045	9,253	18,115	10,130	503,752
Cash Difference	-81,699	2,684	-287,980	-4,367	-4,373	-17,616	-21,415	6,845	421,275	49,562	-18,115	-1,130	43,671
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	663	50,225	32,110	
Cash Position	-70,061	3,084	-287,580	-3,967	-3,973	-17,216	-21,015	7,245	421,675	50,225	32,110	30,980	
Money Borrowed This Period	70,461	0	287,980	4,367	4,373	17,616	21,415	0	0	0	0	0	406,212
Principal Paid on Operating Loan	0	1,974	0	0	0	0	0	0	404,238	0	0	0	406,212
Interest Paid on Operating Loan	0	710	0	0	0	0	0	6,845	16,773	0	0	0	24,329
Ending Cash Balance	400	400	400	400	400	400	400	400	663	50,225	32,110	30,980	Final Balance 30,980
Accumulated Borrowing	70,461	68,487	356,467	360,834	365,207	382,823	404,238	404,238	0	0	0	0	Maximum Borrowed 404,238

LOAN REQUEST  
September 1, 1981  
Case F

Date Completed \_\_\_\_\_

Today's Prime Rate \_\_\_\_\_

1. The following loan request includes both a cattle loan and a land loan request. The land has been rented by Mr. Smith for several years, and is described below. The steers will be bought and sold at the same time as the previous cases. Please indicate the loan granted for both the steers and the land.

## A. Stocker Steers -

<u>Number of Head</u>	<u>Weight (cwt.)</u>	<u>Cost (\$/cwt.)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	4.00	80.55	274,192.20	_____

- B. Operating Inputs - including starter feed, salt, protein supplement, veterinary expenses, and machinery and equipment cost.

<u>Number of Head</u>	<u>Cost (\$/head)</u>	<u>Amount Requested</u>	<u>Amount Granted</u>
851	20.72	17,632.72	_____

## C. Total -

<u>Total Loan Requested</u>	<u>Total Loan Granted</u>
291,824.92	_____

2. Interest Rate \_\_\_\_\_

3. Loan Length \_\_\_\_\_

Payment Type (Annual, Monthly, etc.) \_\_\_\_\_

4. Security or Collateral Requirements \_\_\_\_\_

5. Other Applicable Conditions \_\_\_\_\_

6. Comments \_\_\_\_\_

6(cont'd)

Land Loan

Amount: 420 acres

Type: Class III land

Soil: Kirkland-Tabler-Bethany Association Upland soil.

Deep, nearly level to moderately sloping soil with a clayey subsoil.

Improvements: None

Typical Yield: Wheat - 27 bu.

Grain Sorghum - 20 cwt.

Lease Rate (current): \$10,760 annually

Price: \$700 per acre

- | 1. | <u>Land Loan Requested</u>           | <u>Land Loan Granted</u> |
|----|--------------------------------------|--------------------------|
|    | \$294,000                            | _____                    |
| 2. | Interest Rate                        | _____                    |
| 3. | Loan Length                          | _____                    |
|    | Payment Type (Annual, Monthly, etc.) | _____                    |
| 4. | Security or Collateral Requirements  | _____                    |
|    |                                      | _____                    |
|    |                                      | _____                    |
| 5. | Other Applicable Conditions          | _____                    |
|    |                                      | _____                    |
|    |                                      | _____                    |
| 6. | Comments                             | _____                    |
|    |                                      | _____                    |
|    |                                      | _____                    |

BALANCE SHEET  
September 1, 1981

Case F

<u>Current Assets</u>		<u>Current Liabilities</u>	
Cash	<u>11,638</u>	Interest Payable on	
Leased Land	<u>10,760</u>	Intermediate Notes	<u>4,584</u>
Cash Value Life Insurance	<u>10,500</u>	Long Term Loans	<u>40,893</u>
Stored Crops:		Notes Payable	<u>0</u>
Wheat	<u>19,664</u>	Principal Payments Due on	
Alfalfa Hay	<u>9,848</u>	Intermediate Notes	<u>4,707</u>
Livestock to be Sold:		Long Term Loans	<u>2,517</u>
Calves - Hfrs.	<u>1,824</u>	TOTAL CURRENT LIABILITIES	<u>52,701</u>
Strs.	<u>3,522</u>		
Cows	<u>875</u>	<u>Intermediate Liabilities</u>	
Feed, Seed, Fertilizer	<u>2,813</u>		
TOTAL CURRENT ASSETS	<u>71,444</u>	Machinery and Equipment	
		Notes	<u>33,491</u>
<u>Intermediate Assets</u>		CCC Loans	<u>19,664</u>
Breeding Livestock	<u>6,600</u>	TOTAL INTERMEDIATE LIABILITIES	<u>53,155</u>
Machinery and Equipment	<u>91,415</u>		
TOTAL INTERMEDIATE ASSETS	<u>98,015</u>	<u>Long Term Liabilities</u>	
		Land Loans	<u>508,646</u>
<u>Fixed Assets</u>		TOTAL LIABILITIES	<u>614,502</u>
Land (including buildings)		NET WORTH	<u>438,957</u>
Pasture	<u>104,000</u>		
Class I + II	<u>780,000</u>	TOTAL LIABILITIES AND NET WORTH	<u>1,053,459</u>
TOTAL FIXED ASSETS	<u>884,000</u>		
TOTAL ASSETS	<u>1,053,459</u>		

## INCOME STATEMENT

## Case F

<u>Receipts</u>					<u>1982 (Projected)</u>				
<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>		<u>Crop</u>	<u>Yield</u>	<u>Acres</u>	<u>Price</u>	
Wheat	28	220	3.20	19,664	Wheat	32	30	4.05	3,888
	27	230	3.65	22,722		27	420	4.05	45,927
Hay	4	87	70.00	24,360	Hay	4	120	75.00	36,000
Grain Sorghum	24	160	4.95	19,008	Grain Sorghum	24	160	5.50	21,120
<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>		<u>Livestock</u>	<u>Head</u>	<u>Weight</u>	<u>Price</u>	
Calves - Steers	9	4.60	74.80	3,097	Calves - Steers	9	4.60	80.46	3,331
Heifers	6	4.35	58.83	1,535	Heifers	6	4.45	64.77	1,730
Stockers	301	5.14	68.80	106,443	Stockers	851	6.64	75.75	428,319
Cows	2	9.50	41.79	794	Cows	2	9.50	46.01	874
					Bulls	1	3.20	57.81	185
Total Receipts				197,623	Total Receipts				541,374
<u>Expenses</u>									
Operating Expenses				118,939	Operating Expenses				430,201
Interest Expenses					Interest Expenses				
Real Estate				41,080	Real Estate				40,893
Machinery				5,088	Machinery				4,584
Operating Loan				5,902	Operating Loan				23,173
Total Cash Expenses				165,419	Total Cash Expenses				498,851
Net Cash Income				32,204	Net Cash Income				42,523
Depreciation				9,802	Depreciation				9,802
Net Income				22,402	Net Income				32,721
Income Taxes					Income Taxes				
(Federal and State)				4,191	(Federal and State)				7,788
Income After Taxes				18,211	Income After Taxes				24,933
Family Living Expense				12,000	Family Living Expense				12,000
Retained Earnings				6,271	Retained Earnings				12,933

PROJECTED CASH FLOW  
September 1, 1981 to August 31, 1982  
Case F

ITEM	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Total Operating Receipts	9,185	26,442	0	0	262	0	350	0	437,319	58,815	0	9,000	541,374
Total Operating Expenses	26,485	17,526	287,119	3,666	3,643	16,836	20,685	4,462	15,175	8,289	17,150	9,166	430,201
Capital and Other Expenses													
Family Living	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
Capital Expense	0	0	0	0	0	0	0	0	288	0	0	0	288
Interest Expense (land and machinery)	45,477	0	0	0	0	0	0	0	0	0	0	0	45,477
Principal Payment (land and machinery)	7,224	0	0	0	0	0	0	0	0	0	0	0	7,224
Total Cash Outflow	80,186	18,526	288,119	4,666	4,643	17,836	21,685	5,462	16,463	9,289	18,150	10,166	495,191
Cash Difference	-71,001	7,916	-288,119	-4,666	-4,380	-17,836	-21,335	-5,462	420,856	49,526	-18,150	-1,166	46,183
Beginning Cash Bal.	11,638	400	400	400	400	400	400	400	400	4,438	53,964	35,814	
Cash Position	-59,363	8,316	-287,719	-4,266	-3,980	-17,436	-20,935	-5,062	421,256	53,964	35,814	34,648	
Money Borrowed This Period	-59,763	0	288,119	4,666	4,380	17,836	21,335	5,462	0	0	0	0	401,561
Principal Paid on Operating Loan	0	7,313	0	0	0	0	0	0	394,248	0	0	0	401,561
Interest Paid on Operating Loan	0	603	0	0	0	0	0	0	22,570	0	0	0	23,173
Ending Cash Balance	400	400	400	400	400	400	400	400	4,438	53,964	35,648	34,648	34,648
Accumulated Borrowing	59,763	52,450	340,569	345,235	349,615	367,451	388,786	394,248	0	0	0	0	394,248

Final Balance

Maximum Accumulated Borrowing

VITA |

Timothy Lee Cross

Candidate for the Degree of

Master of Science

Thesis: FINANCIAL AND LIQUIDITY MANAGEMENT STRATEGIES FOR A NORTH  
CENTRAL OKLAHOMA WHEAT AND LIVESTOCK FARM

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Apalachia, New York, August 5, 1958, the  
son of Mr. and Mrs. Robert Cross. Married, May 31, 1980,  
to Cara Lynn Hall.

Education: Graduated from John Marshall High School, Oklahoma  
City, Oklahoma, in May, 1976; received the Bachelor of  
Science in Agriculture degree with a major in Agricultural  
Economics from Oklahoma State University in 1980; completed  
requirements for the Master of Science degree at Oklahoma  
State University in May, 1982.

Professional Experience: Graduate Teaching Assistant, September,  
1980 - December, 1980 and Graduate Research Assistant,  
January, 1981 - March, 1982, Department of Agricultural  
Economics, Oklahoma State University.